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NATIONAL BUREAU OF ECONOMIC RESEARCH

## BULLETIN ON AGING AND HEALTH

### The Effect of Rising Health Care Costs on U.S. Tax Rates

Health care spending in the U.S. now accounts for 17.6 percent of GDP, a figure that could grow to 26 percent by 2035 if current trends continue. Public expenditures on health care, including Medicare, Medicaid, and other insurance and direct care programs, account for nearly half of all health care spending. If health care costs continue to rise, taxes will need to be raised to fund these programs. Indeed, the recent health reform law raised Medicare taxes on high-income workers to keep that program solvent for an additional decade or so.

How high might tax rates on different groups have to go in the future to fund government health care programs? How large would the efficiency costs associated with these higher taxes be (that is, how much GDP may be lost due to tax-motivated changes in labor supply and savings behavior)? These questions are the focus of a new working paper by NBER researchers **Katherine Baicker** and **Jonathan Skinner**, “**Health Care Spending Growth and the Future of U.S. Tax Rates**” (NBER Working Paper 16772).

The authors first develop a macroeconomic model based on choices about working, consumption, and saving. The model includes a government sector that levies taxes and uses part of the revenue to pay for longevity-enhancing health care. Based on forecasts by the Congressional Budget Office, the authors assume that new tax revenues equal to 8 percent of base-

line GDP will be needed to fund health care costs in 2060.

The authors then use their model to simulate several scenarios for raising this additional revenue. In the first, marginal income tax rates are raised so as to maintain the shares of taxes paid by high-income taxpayers, middle-income taxpayers, and low-income taxpayers. In this scenario, marginal tax rates rise from 18 to 21.8 percent for the lowest income group and from 42 to 70 percent for the very highest income group (those now in the 33 or 35 percent bracket). These tax increases slow GDP growth, so that in 2060 per-household GDP is 11 percent lower than it would have been otherwise, or \$133,900 instead of \$149,400. The average loss in utility is roughly \$2.48 for every additional dollar of tax revenue raised, yielding a net cost to society (or efficiency cost) of \$1.48.

In the second scenario, payroll taxes are increased by 12.4 percent across the board. The resulting tax system is much less progressive than in the first scenario, as the marginal tax rates for the lowest and highest income groups are 30.4 percent and 54.4 percent, respectively. However, the efficiency cost is much lower too, at \$0.41 per dollar of revenue raised, and GDP declines by only 5.2 percent relative to baseline.

In a third scenario, the after-tax-income Gini coefficient is held constant rather than the tax shares. This generates a similar top marginal tax rate to that in the second scenario, 52.8 per-

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cent. This approach is less progressive than the first scenario because when taxes rise faster than income, holding tax shares constant implies that the share of income devoted to taxes rises more for high-income groups.

Finally, the authors repeat their first scenario but assume that the new revenues needed would be only 4 percent of GDP rather than 8 percent. They find that even with the tax structure of the first scenario, the top marginal rate (56.2 percent) is similar to that in the second and third scenarios, as is the loss in GDP (5.1 percent), highlighting the important role that potential improvements in health care productivity play.

These findings illustrate the trade-off between equity and efficiency that often arises in tax policy. To raise the same amount of revenue, there is only

half as much loss in economic activity under the flat payroll tax hike as under the tax-share-preserving policy (scenario 2 vs. 1). The simulations also demonstrate the value of cutting back on waste in health care, as this avoids distortionary taxes that can reduce economic activity quite significantly. Nonetheless, the authors find that no matter how the revenue is raised, the value of the health improvements funded by taxes is greater than the efficiency cost arising from reduced economic activity.

To explore whether policy makers respond to the efficiency cost of provid-

ing additional resources to the health care sector, the authors examine data for OECD countries in which they estimate the link between a country's tax-to-GDP ratio in 1979 and the subsequent rise in its health care spending. They find that those countries with high initial ratios (who would have faced greater efficiency costs from raising taxes) experienced slower growth in health spending over the next three decades.

While most observers of the U.S. health care system conclude that there must be a break in the trend of rising real health care costs at some point, it

is not clear what policy or condition would effect that change. This study suggests "strains on the revenue-raising system may exert a natural brake on health care spending, and thus may be a key (albeit inefficient) mechanism for constraining overall health care spending growth."

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## Mortality, Health, and Disability Insurance Around the World

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High and rising expenditures on disability insurance (DI) programs are a major concern in the U.S. and many other developed countries. The proportion of men collecting disability benefits at older ages varies greatly across countries—for example, more than 35 percent of 64-year-old men in Sweden and more than 25 percent of those in the Netherlands are on DI, versus 10 percent or less in Belgium, Italy, and Spain. Does this reflect differences in the underlying health status of older individuals in these countries? Or do differences in the provisions of the DI systems explain this variation in DI take-up rates?

These and related questions are explored in "**Social Security and Retirement Around the World: Mortality and Health, Employment, and Disability Insurance Participation and Reforms—Introduction and Summary**" (NBER Working Paper 16719). As editors **Kevin Milligan** and **David Wise** explain, this is the introduction to the fifth volume in the NBER's ongoing international social security project. This project involves a team of analysts in twelve developed countries conducting comparable analyses of their own country's social security program, effectively treating the vast differences in program provisions across countries as a natural laboratory to study the effect of these provisions on labor force participation.

The authors begin by considering changes in mortality over time and the relationship between mortality and labor force participation. Mortality is of particular interest as a health measure because it is comparable across countries and over time within countries. The authors find that mortality at age 65 was fairly constant in the 1950s and 1960s but began to decline after 1970, with those countries that initially had the highest mortality rates experiencing the most rapid improvements. The variation in mortality across countries is small relative to the variation in labor force participation, suggesting that differences in health may explain relatively little of the cross-country differences in labor force participation. The authors also show that cross-country mortality rates diverge as mortality increases.

Mindful that mortality is not the only health outcome measure of interest, the authors next explore how trends in mortality compare to trends in self-assessed health within a country. In general, there is a strong relationship between the two trends, though there are large differences in the level of self-reported health across countries. The individual country analyses broaden this to examine other indicators of health status, the availability of which varies greatly from country to country.

Next, the authors consider whether

trends in DI participation are related to changes in mortality and other health measures within a country over time. They find a very weak relationship between the two, leading them to conclude "DI insurance reforms are largely a train on their own track and not endogenously determined with respect to health."

Finally, the authors consider "natural experiments" in several of the countries, in which DI reforms were enacted for reasons other than changes in the health or employment behavior of older individuals (e.g., by a court decision). In Canada, for example, concern about the cost of the DI program led to the removal of socio-economic considerations in eligibility determinations and a new emphasis on self-sufficiency and returning to work, among other changes. After the enactment of the reform, the share of men age 60 to 64 on DI fell from 14 percent to under 8 percent, a decline of nearly half. A key lesson from many of the reforms is the importance of substitution between programs for older workers (for example, between DI, unemployment benefits, and early retirement benefits) and the importance of non-health factors in DI take-up decisions.

This volume lays the groundwork for the next stage of the project, which will address the following question: "given health status, to what extent are the differences in labor force participation across

countries determined by the provisions of DI programs?" The current volume has explored many issues that are inputs into this later study, such as the comparability

of health outcome measures across countries and the extent to which DI provisions are prompted by a country's health status or employment circumstances.

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## The Economics of State and Local Pensions

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The rising cost and unfunded liabilities of public pension systems and retiree health plans have become a matter of increasing public concern in recent years. Estimates of the amount by which public pension plans are underfunded range as high as \$3 Trillion, raising concerns about the ability of state and local governments to make good on their promises to workers and retirees while continuing to provide the level of services expected by taxpayers.

In **"The Economics of State and Local Public Pensions"** (NBER Working Paper 16792), researchers **Jeffrey Brown, Robert Clark, and Joshua Rauh** provide an economics-based perspective on the financial aspects of state and local pension plans in the U.S., drawing on work by numerous researchers for an NBER research program on this topic.

The vast majority of public sector workers are covered by employer-sponsored defined benefit (DB) pension plans and by retiree health insurance plans. The situation is markedly different in the private sector, where only 15% of non-unionized workers have DB plans and over one-third have no access to any retirement plan; access to retiree health insurance in the private sector is also rare. Public sector pensions tend to have higher benefits and lower retirement ages than private sector plans.

Compared to defined contribution (DC) plans, which are automatically fully funded, whether DB plans are fully funded is a matter of how much money has been put into the plan, how the plan's investments have fared, and what future benefits are expected to be. While virtually everyone agrees that public pension plans are underfunded, there is a surprising amount of disagreement about the size of the liabilities.

The main issue is the choice of the appropriate rate to use to discount future benefits back to the present. Most economists and finance scholars believe that the appropriate rate is one that reflects the risk of the cash flows being discounted and that this rate is in the range of 4 percent. Many plan administrators, policy makers, and labor unions, by contrast, prefer to use the expected rate of return on plan assets and suggest a rate of 7 to 9 percent. Using the (inappropriately) higher discount rate, unfunded liabilities are estimated to be only \$800 Billion, versus \$3 Trillion using the lower rate.

Whether full funding is optimal is in fact a matter of some dispute. Some scholars argue that each generation of taxpayers should pay the full cost of the public services it receives and worry that governments may give employees overly generous pensions in lieu of current wages in order to transfer the burden of paying for services on to future generations. But others point out that full funding could lead politicians to raise benefits when funding levels are high, ignoring the fact that they may not be able to reduce them when levels are lower. Still others, more provocatively, have suggested that under certain conditions, governments should not fund plans at all and instead pay for all retiree benefits out of current tax revenues.

There is also debate on the question of how public pension plans should invest their assets. While some suggest that an all-bond portfolio is most appropriate and would insulate plans from fluctuations in interest rates and equity markets, others argue for a portfolio with some equity holdings since pension liabilities depend on wage growth, which may be correlated with equity returns.

Although it is not clear exactly how much of a public pension plan's portfolio should be invested in equities, it appears that many plans are taking on too much risk—the typical portfolio has only one-quarter of its assets in fixed income securities and the remainder in equities and similarly risky investments. Evidence suggests that managers of public plans take more risk if their plan has recently performed poorly, if managers use a higher discount rate to calculate liabilities, and if the plan has more plan participants represented on its Board of Trustees.

The recent economic crisis has worsened the funding situation of many public pension plans, as a result of their heavy investment in equities. Yet portfolio allocation is far from the only cause of the problem—a history of failing to make sufficient annual contributions and of increasing benefits during good times have also helped to create the unfunded liabilities.

To solve their funding problems, state and local governments must either dedicate new revenue to their pension systems or cut benefits. However, a number of states appear to be constitutionally constrained in their ability to reduce benefits by a "non-impairment" clause. Even in states without such a clause, courts have interpreted employment contracts as providing pension protection, at least for benefits accrued to date. Some states have responded by creating a two-tier system with lower benefits for new employees, a move that may hurt their ability to recruit high-quality workers. However, studies suggest that even significant cuts in benefits will be insufficient to close the funding gap, suggesting that taxpayers will ultimately bear the brunt of legacy pension costs.

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## Using Nudges in Exercise Commitment Contracts

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Sedentary lifestyles are a major contributor to the rising incidence of obesity and obesity-related diseases like hypertension and diabetes in the U.S. Many individuals are aware of the health benefits of exercise and claim to want to be more active, but are unable to translate their good intentions into sustained behavioral change.

Behavioral economics may help to explain this failure. Starting and sustaining an exercise program requires incurring immediate costs in order to obtain future rewards. According to the theory of dynamic inconsistency, decision-makers are more impatient with respect to near-term tradeoffs than to long-term tradeoffs. People believe that exercise is worthwhile when thinking of the long run, but the costs of exercise loom larger when they are deciding whether to exercise today. They may defer exercising to another day, and by making the same decision day after day end up postponing it indefinitely.

Numerous studies of saving, another behavior potentially affected by dynamic inconsistency, suggest that a “nudge” in the form of a default may strongly influence behavior. In **“Committing to Exercise: Contract Design for Virtuous Habit Formation”** (NBER

Working Paper 16624), researchers **Jeremy Goldhaber-Fiebert, Erik Blumenkranz, and Alan Garber** conduct a randomized controlled trial to explore the effect of nudges and anchoring on the exercise commitment contracts individuals enter into using a web-based contract creation tool ([www.stickk.com](http://www.stickk.com)).

In the experiment, users of the tool select a contract length (duration), number of times per week to exercise (frequency), and a financial penalty for failing to live up to the contract (stake). The authors randomly set the default duration seen by users to be either 8, 12, or 16 weeks, though users are free to change the duration with a simple click of the mouse. The authors also randomly assign some users to see a notice informing them that those who agreed to pay a financial penalty for failing to live up to their contract are more successful at fulfilling their commitment.

The authors examine whether these nudges affected the likelihood of users’ accepting a contract as well as the chosen duration, frequency, and financial stake. Their experiment included data for 619 adult users, roughly 60 percent of who accepted an exercise contract.

The authors’ principal finding is that

users who were shown a longer default contract duration chose contracts of longer duration. There was no effect on the chosen exercise frequency, so showing users a longer default contract duration led them to contract for a greater number of total exercise sessions. There was no effect of the default duration on the probability of accepting a contract or on the chosen financial stake.

As the authors acknowledge, one limitation of their study is that they were not able to evaluate contract compliance and so could not determine whether entering into longer contracts helped people to form long-term exercise habits. However, they are already at work on answering this question using a new longitudinal study of users. They conclude, “to the extent that longer contracts increase long-term exercise habit formation, carefully designed default values can lead users towards selecting exercise commitment contracts with lengths optimal for addressing sedentary lifestyles.”

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## Raising the Limit on Social Security Covered Earnings

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The U.S. Social Security system faces a substantial long-term funding gap. One of the most commonly suggested remedies is to increase the level of earnings subject to Social Security taxes. Currently, only earnings up to \$106,800 are taxed, though workers pay Medicare taxes on earnings above this level. Raising or eliminating the cap on earnings subject to Social Security taxes would generate additional revenues for the system.

A less well-understood effect of raising the limit on covered earnings is that it would increase Social Security benefits for workers, since benefits are based on workers’ covered earnings over

their best thirty-five years. This effect would tend to offset, at least in part, the additional revenues from the earnings limit increase.

In **“The Growth in Social Security Benefits Among the Retirement Age Population from Increases in the Cap on Covered Earnings”** (NBER Working Paper 16501), researchers **Alan Gustman, Thomas Steinmeier, and Nahid Tabatabai** examine this issue. The authors make use of the actual changes in the limit on covered earnings over the past several decades to ask how the taxes and benefits of more recent cohorts would have differed if these workers had been subject to the limits

faced by earlier cohorts.

While the limit on covered earnings is now adjusted automatically each year to match the growth in average wages, in the past the limit was often unchanged for long periods of time and then subject to dramatic increases. The percent of male workers with earnings above the limit rose from 5 percent in 1940 to nearly 50 percent by 1965, before declining to around 10 percent by 1990 and stabilizing at this level. These dramatic changes mean that workers from different birth cohorts with the same actual earnings profiles could have very different covered earnings histories.

The authors use data from the Health and Retirement Study. Their basic approach is to take younger cohorts (born 1948–1953) and recompute their Social Security taxes and benefits applying the limits on covered earnings faced by cohorts born twelve and twenty-four years earlier. All other factors, such as workers' real earnings, are held constant.

The authors' key finding is that the higher limits on covered earnings faced by younger cohorts increased their Social Security taxes and benefits by 3.7 percent and 1.5 percent, respectively, relative to the levels they would have experienced with the limits in place twelve years earlier (and by 10.7 and 5.3 percent relative to the limits in place twenty-

ty-four years earlier). Approximately 25 to 30 percent of the additional tax revenue raised was diverted to pay for the benefit increases.

As expected, the increases in taxes and benefits are highly concentrated among men in the top quartile of earnings — their taxes and benefits increased by 12.7 percent and 3.9 percent relative to the level of twelve years earlier (and by 26.7 and 10.2 percent relative to the level of twenty-four years earlier). Increases for men in lower earnings quartiles and for women were smaller.

The authors conclude by pointing out that an increase in the limit on covered earnings is different from an across-the-board increase in the payroll tax rate in two ways. First, raising the earnings

limit restricts the tax increase to those with the highest earnings. Second, this approach suffers from a “leaky bucket” problem, as part of the new tax revenue raised will be needed to cover the increase in benefits. While in theory the benefit formula could be changed to eliminate the benefit increase, some may be reluctant to do so because they feel this would violate the insurance principle underlying the program. This paper suggests that the tax increase resulting from a rise in the covered earnings limit has been three to four times the size of the benefit increase.

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## The Asset Cost of Poor Health

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Health care costs are a major financial concern for elderly households. Understanding the risk of health care costs at older ages is also important for the design of public and private insurance programs, such as employer-provided pensions and retiree health insurance as well as Social Security, Medicare, and Medicaid.

Past studies of the health care costs incurred by older households have often focused on out-of-pocket medical spending, finding these expenditures to be substantial and highly skewed. Yet such estimates may miss other important dimensions of the cost of poor health. Poor health may result in reduced earnings near the end of an individual's work life, or it may trigger expenses associated with home renovation, relocation, or the hiring of various service providers. Moreover, the financial consequences of poor health may grow over time, as poor health tends to be an ongoing condition.

In “**The Asset Cost of Poor Health**,” (NBER Working Paper 16389), researchers **James Poterba**, **Steven Venti**, and **David Wise** attempt to infer the “full cost” of poor health by estimating the cumulative effect on assets of all the adverse consequences of poor health over a long period of time.

Data from the Health and Retirement Study (HRS) for the period 1992–2008 are used in the analysis.

The authors compare the evolution of assets over time for older individuals who in 1992 (when they are ages 51 to 61) have similar assets but different levels of “latent health.” Latent health is an index that incorporates answers to numerous health questions, such as whether the individual has difficulty working for pay, has difficulty climbing stairs or performing other activities of daily living, or has experienced heart problems or other specific health conditions. This measure is strongly related to the subsequent onset of future health problems and to mortality, suggesting that it is a good summary measure of health status.

The results indicate that the asset cost of poor health may be quite large, substantially greater than most estimates of out-of-pocket medical spending. For example, within each asset quintile, the healthiest individuals (those in the top tercile, or third, of the health distribution) accumulate at least 50 percent more assets by 2008 than do the least healthy (those in the bottom tercile of health). The dollar differences in wealth accumulation are substantial — for those near the median of the wealth

distribution in 1992, the difference in asset accumulation over the 1992–2008 period between the healthiest and least healthy groups is over \$135,000. For the top asset quintile, the difference is over \$470,000.

As the authors point out, poor health can reduce asset accumulation in many ways. It may lead to greater health-related expenditures, to lower earnings, and to lower Social Security benefits and other retirement annuity income as a result of lower earnings and earlier claiming of benefits. The authors find that between 20 and 40 percent of the asset cost of poor health can be attributed to lower earnings and lower annuity income.

In future work, the authors hope to explore some of the other reasons poor health reduces asset accumulation among older households. For example, people in poor health may do less new saving or may receive lower rates of return on their investments as a result of having less time to manage their portfolio or reduced cognitive ability.

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## NBER Profile: *Christina H. Paxson*

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Christina H. Paxson is a Research Associate in the NBER's Programs on Aging, Children, Healthcare, and Education. She is also the Hughes Rogers Professor of Economics and Public Affairs and the Dean of the Woodrow Wilson School of Public and International Affairs at Princeton University.

Paxson was the founding director of the Center for Health and Wellbeing, an interdisciplinary health research center in the Woodrow Wilson School. She is a Senior Editor of *The Future of Children*, and a Research Associate of Princeton's Office of Population Research. She was the founding director of Princeton's NIH-funded Center for the Demography of Aging.

Paxson's research interests are in the areas of applied economics, health, and development economics. Her current research focuses on eco-

nomics status and health outcomes over the life course in both developed and developing countries. She has investigated the effects of early life environments on children's cognitive development in the United States, the United Kingdom, and Ecuador, as well as the long-run effects of early life health problems on economic status in adulthood.

Paxson received her B.A. from Swarthmore College, and her Masters' and Ph.D. from Columbia University. She has spent her entire professional career at Princeton, except for a visiting professorship at the Wharton School, University of Pennsylvania, in 1999.

Paxson has two children: a teenage son, and another son who is a senior at Swarthmore College. She is married to Ari Gabinet, general counsel of OppenheimerFunds.

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## NBER Profile: *Katherine Baicker*

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Katherine Baicker is a Research Associate in the NBER's programs in Health Care, Aging, Public Economics, and Education. Baicker is a Professor of Health Economics in the Department of Health Policy and Management at the Harvard School of Public Health.

From 2005–2007, Professor Baicker served as a Member of the President's Council of Economic Advisers, where she played a leading role in developing health policy. She currently serves on the Editorial Boards of *Health Affairs*, the *Journal of Health Economics*, and the *Forum for Health Economics and Policy*; as Vice Chair of the Board of Directors of AcademyHealth; on the Congressional Budget Office's Panel of Health Advisers; and as a Commissioner on the Medicare Payment Advisory Commission.

She received her B.A. in economics from Yale in 1993 and her Ph.D. in economics from Harvard in 1998. She has previously served on

the faculty of the School of Public Affairs at the University of California, Los Angeles; the Harris School of Public Policy at the University of Chicago; and Dartmouth College and Medical School.

Professor Baicker's research focuses primarily on the factors that drive the distribution, generosity, and effectiveness of public and private health insurance, with a particular focus on health insurance finance and the effect of reforms on the distribution and quality of care. Her research has been published in journals such as *Health Affairs*, the *Journal of Public Economics*, and the *Quarterly Journal of Economics*, and has been featured in the *New York Times*, the *Wall Street Journal*, *Business Week*, and on National Public Radio. She is currently one of the leaders of a research program investigating the effects of expanding health insurance coverage in the context of a



randomized Medicaid expansion in Oregon.

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