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BULLETIN ON AGING AND HEALTH

The Long Reach of Childhood Health

Policy makers everywhere are interested in the health of their populations, and therefore concerned about the link between health and economic status. Whether one looks across countries, across individuals in the same country, or across time within a given country, the story is the same — being richer is associated with better health. While this link is well-established, however, the direction of causality is not. Does low economic status lead to poor health, or does poor health lead to low economic status, or both?

In “**Causes and Consequences of Early Life Health**” (NBER Working Paper 15637), researchers **Anne Case** and **Christina Paxson** focus on a specific aspect of this question: the association between childhood health and economic and health outcomes later in life.

The authors note that relatively little is known about the impact of early life health on adult labor force outcomes because there are few data sets that follow individuals from birth through adulthood. In light of this challenge, researchers have recently begun to use height as a marker of early life health and nutrition. The authors use five longitudinal data sets from the U.S. and Britain to examine the impact of height on later life outcomes.

Previous research suggests that final adult height depends on several factors, including genes, environmental conditions, and interactions of these. Differences in average heights across

countries and the increase in heights in the developed world in the 20th century are believed to be due largely to environmental factors. Environmental conditions thought to affect height include prenatal factors such as maternal smoking and low birth weight, as well as early childhood exposure to poor nutrition, infections, and psychosocial stress. Some research suggests that these factors affect health throughout life.

Turning to their analysis, the authors find that height is associated with improved economic outcomes in all five of their data sets. Each additional inch of height is associated with an increase in schooling of 0.05 to 0.16 years and an increase in the probability that men work of 0.2 to 0.6 percentage points. Height affects earnings as well — using the midpoint of their estimates, moving from the 25th to 75th percentile of height is associated with an 8 percent increase in earnings.

Height is associated with better adult health as well. Taller individuals report better overall health and fewer long-standing illnesses and are less likely to be disabled. In older adulthood, taller individuals have fewer problems with activities of daily living and are less likely to be depressed. Taller adults also perform better on cognitive tests.

Does childhood health affect adult outcomes primarily by influencing educational attainment, which then affects adult labor force and health outcomes, or does it have independent, long-run effects on these measures? To answer

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The NBER Bulletin on Aging and Health summarizes selected Working Papers recently produced as part of the Bureau's program of research in aging and health economics. The Bulletin is intended to make preliminary research results available to economists and others for informational purposes and to stimulate discussion of Working Papers before their final publication. The Bulletin is produced by David Wise, Area Director of Health and Aging Programs, and Courtney Coile, Bulletin Editor. To subscribe to the Bulletin, please send a message to: abb@nber.org.

this, the authors re-estimate their models controlling for schooling. They find that the effects of height decline but are still significant, suggesting that childhood health has direct effects on adult outcomes.

These results underscore the importance of early childhood, but shed little light on which specific aspects of childhood are being captured by height. To explore this, the authors conduct an analysis with the National Longitudinal Survey of Youth (NLSY) and the follow-on study of children of NLSY respondents. This data set includes information on the children's educational outcomes, health during childhood, and the prenatal environment to which they were exposed. Importantly, the data set includes siblings, which allows the authors to control for genet-

ic material and unmeasured environmental factors siblings share, so they can test whether measured differences in the environment (such as in exposure to maternal smoking) are associated with differences in outcomes.

The authors find that taller children have higher educational attainment and are more likely to be in the right grade for their age. They verify that these differences are not the result of taller children starting school earlier, nor of taller children having higher self-esteem. Rather, they are consistent with taller children having higher cognitive ability.

Finally, they explore why some children are taller than others, particularly

within sibling pairs. They find that birth length and weight are positively associated with adult height. Maternal smoking and drinking affect birth length and weight, but have no independent effect on adult height. Lack of prenatal care also depresses adult height.

The authors note that understanding the long-run consequences of child health may help policy makers assess the benefits of interventions that improve child health and may be useful in making projections of trends in adult morbidity and disability. Their findings suggest “height, which reflects (in part) environmental conditions in the prenatal and early childhood periods, can be used to understand the long-run con-

sequences of childhood health.” While they caution that the environments in which children are being raised today are quite different from those experienced by the oldest individuals in their data, the fact that children born in the last two decades have poorer cognitive performance and schooling outcomes “indicate that child health is likely to remain an important determinant of health and economic status once these children reach adulthood.”

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Tax Breaks for Employer-Sponsored Health Insurance

One of the most-discussed issues during the recent health care reform debate was the proposal to cap the tax exclusion for employer-sponsored health insurance. Currently, employers’ spending on health insurance premiums is exempt from taxation for both employers and employees. Premiums paid by employees are exempt as well if the firm has established a Section 125 cafeteria plan; roughly 80 percent of employees with insurance have such a plan. This tax exclusion is extremely costly—it reduces federal and state tax revenues by \$260 Billion per year and is the government’s third largest expenditure on health care, after Medicare (\$400 Billion) and Medicaid (\$300 Billion).

What are the arguments for and against the tax exclusion for employer-sponsored insurance (ESI)? How would reducing or eliminating this exclusion affect tax revenues and insurance coverage? These questions are the subject of a recent working paper by researcher **Jonathan Gruber**, “**The Tax Exclusion for Employer-Sponsored Health Insurance**” (NBER Working Paper 15766).

ESI is the dominant form of insurance for the non-elderly population in the U.S. More than sixty percent of non-

elderly individuals receive their insurance through their own employer or that of a family member. By contrast, only six percent purchase insurance privately through the non-group market. The remainder of the population is either insured by the government (19 percent) or uninsured (17 percent).

The author begins by noting that the primary argument for the tax exclusion is that it may be the “glue” holding the ESI system together. ESI provides an important pooling mechanism, that is, a way to create large pools of individuals with predictable distributions of risk. Workers at high risk of having large health expenditures are pooled together with other healthier workers, allowing them to access insurance at a reasonable price. In the non-group market, by contrast, insurers worry that those seeking coverage may be high-risk individuals. Prices are high and variable, and in most states individuals can be excluded from coverage based on their health status. Without the tax exclusion, employers might cease to offer ESI and individuals might have to turn to the non-group market, where affordable coverage may not be available, particularly for sicker individuals.

The author notes that there are also numerous costs of the ESI exclu-

sion, starting with the revenue cost. Furthermore, the benefits of the tax exclusion flow disproportionately to those at the top of the income distribution, since the value of the exclusion rises with the individual’s income tax rate and richer individuals are more likely to have insurance and to have more generous plans. The tax exclusion may also bias individuals towards buying excessively generous insurance, as it makes insurance cheaper relative to other goods. Finally, it may distort workers’ decisions with respect to job changes and retirement.

In his primary analysis, the author uses a microsimulation model of health insurance to simulate the effect of repealing or capping the tax exclusion. The model takes a sample of individuals from the Current Population Survey and matches this to information on health insurance premiums and health costs. The model incorporates behavioral responses by firms and employees to changes in the price of insurance. Specifically, firms make decisions about whether to offer insurance, how to divide premiums between the firm and employees, and what the level of insurance spending should be; workers decide whether to take up insurance offered by the firm and wheth-

er to buy in the non-group market. To determine the magnitude of these behavioral responses, the best available empirical evidence is used. The author notes, however, that his findings “must be interpreted with considerable caution, as they are using the price elasticity estimated from existing variations in the tax price to estimate the impact of a much more radical change in policy.”

The author first simulates the effect of repealing the tax exclusion for ESI. He estimates that this policy will lead to a one-third reduction in employer spending on health insurance, due in part to a reduction in firms’ contributions to premiums. Importantly, there is also a decrease in the number of individuals with ESI of 15 million, or roughly 10 percent of the number with ESI prior to the repeal. Some of those losing ESI purchase non-group coverage or move to government insurance, so the net increase in the number of uninsured is 11 million, or 22 percent relative to the baseline number of insured. Those who leave ESI are similar in health status to those who stay, mitigating concerns that

there might be a further unraveling of ESI due to changes in the composition of the pool.

Next, the author simulates a policy of removing the tax exclusion for employers but continuing to allow an exclusion for section 125 spending. This policy is estimated to raise \$184 Billion, versus \$263 Billion from full repeal. There is a large rise in employee spending, as spending migrates from employers to the section 125 accounts. As the author notes, “this highlights the leakages in revenue raising that can occur from partial reform.” The number of uninsured rises by 10 million under this policy.

The complementary policy — keeping the tax exclusion for employers but removing deductibility of section 125 accounts — raises only \$42 Billion and increases the number of uninsured by only one million. Relative to full repeal, eliminating the exclusion for the income tax but maintaining it for the payroll tax raises less revenue and has a smaller effect on the number of uninsured, as one might expect, but also places more

of the burden of the policy on those at the top of the distribution, since they benefit most from the income tax exclusion.

Finally, the author simulates the policy of capping the tax exclusion rather than eliminating it. Specifically, he caps the exclusion as the median level of premiums — roughly \$5,200 for individual plans and \$13,700 for family plans. This policy raises only \$47 Billion, but also increases the number of insured by only one million.

The author concludes that the ESI exclusion is costly and highly regressive, so “repealing or capping the exclusion could result in significant increases in government revenues and an improvement in revenue raising progressivity.” However, he also cautions that these policies could lead to a significant reduction in insurance coverage. He suggests “when considering changes to the tax treatment of ESI, policy makers may simultaneously wish to examine other policies that affect the availability of non-ESI coverage.”

Gains from Choice in Health Insurance

A majority of non-elderly Americans receive health insurance through an employer. Once individuals decide to take up employer-provided health insurance, their choice of plan is restricted to whatever menu is offered by the employer. Often, those choices are quite limited. A recent Kaiser Family Foundation survey found that 80 percent of firms offered a single plan, while only 6 percent of firms offered a choice of three or more plans.

How much would consumers benefit if they had greater choice among insurance plans? This question has special relevance now, in light of the recent debate over health care reform. The proposed changes to the health care system could lead to a sizeable reduction in employer-sponsored health insurance and a rise in insurance purchased on the individual market. Such a move could potentially increase the cost of insur-

ance, since prices on the individual market are typically higher, but also provide individuals with a greater choice among plans.

The value of choice is explored in a recent study by researchers **Leemore Dafny, Katherine Ho, and Mauricio Varela**, “**Let Them Have Choice: Gains from Shifting Away from Employer-Sponsored Health Insurance**” (NBER Working Paper 15687).

In the paper, the authors estimate how much employees would be willing to pay for the right to apply their employer subsidy to the insurance plan of their choice. As an analogy, the authors give the example of an employer who offers employees a heavily-subsidized new vehicle, but only two specific models from which to choose. The question is what share of the subsidy the employee would forego to be able to pick a different car.

To address this question, the authors use a unique proprietary data set of employer plan offerings and employee plan choices for a sample of over 800 large employers. The data cover the period 1998 through 2006 and represent over 10 million employed workers per year.

The authors’ analysis proceeds in several steps. First, they estimate a model of employee health plan choice to learn how much employees value different characteristics of the plan, such as the level of co-payments, the type of insurance plan (PPO, HMO, POS), and the specific insurance carrier (e.g. Aetna). Second, they estimate a model that describes the relationship between plan characteristics and premiums – for example, how much more a plan with low co-payments costs relative to a plan offered by the same employer in the same market that has high co-payments.

Finally, they use the results of both analyses to predict what plans employees would choose and how much their welfare would increase under scenarios with greater choice.

The authors simulate several different scenarios. First, they keep the total number of plans the same, but in place of the menu actually offered by the firm they use the plans the firm's employees would have liked best out of all those offered in the same market and year ("plan swapping"). Second, they give employees access to their preferred plan within each plan type, that is, access to the best PPO, HMO, and POS plans for them given their characteristics and preferences ("all plan types"). Finally, they give employees access to all plans available in that market and year ("all plans"). The "plan swapping" scenario will generate the smallest welfare gain from switching, while the "all plans"

scenario will generate the largest, since it provides employees with the widest range of choices.

Turning to the results, the authors find that the estimated annual gains for the median covered person would be \$504, \$970, and \$2,045 for the plan swapping, all plan types, and all plans scenarios, respectively. The authors conservatively select the plan swapping scenario as their preferred estimate, and find that it generates a welfare gain equivalent to 21 percent of average premiums.

As the authors note, to interpret these results they need to project how premiums might increase when employees have more choices. Such increases might occur, for example, because administrative costs are higher when consumers shop on an individual basis rather than in groups. While estimates of the potential premium increase vary,

the authors conclude "the value of choice is rather likely to exceed its cost, as least for most employees and their dependents."

The authors note some caveats to their analysis. They do not model some costs of increased choice such as consumer shopping costs and switching costs. Conversely, their estimates may represent a lower bound on the value of increased choice because they observe only a subset of the plans available in the market. Furthermore, they do not model differences in preferences within employer groups, and doing so would tend to increase the gains from better matching of plans to specific employees. They conclude that "the value of choice is a nontrivial benefit" of a transition away from employer-sponsored insurance, and "may more than offset the higher costs associated with the individual marketplace."

NBER Profile: *Jonathan Skinner*

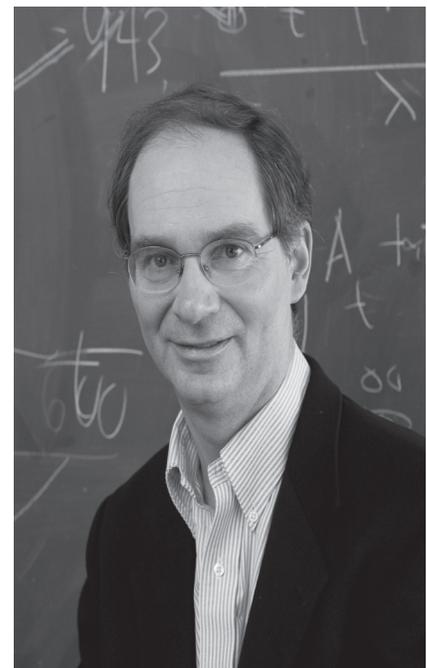
Jonathan Skinner is a Research Associate of the NBER's programs in aging, health care, and public economics. Skinner is the John Sloan Dickey Third Century Professor in Economics at Dartmouth College and a Professor of Community and Family Medicine at Dartmouth Medical School, where he works with the Dartmouth Institute for Health Policy and Clinical Practice.

Dr. Skinner is a member of the Board of Editors of the American Economic Journals: *Economic Policy* and the *Annals of Internal Medicine*, as well as a Co-editor and former Editor of the *Journal of Human Resources*. He has served on the Nominating Committee and the Program Committee for the American Economic Association. Dr. Skinner is a member of the Data Monitoring Committee for the Health and Retirement Study and has served on the Board of Overseers for the Panel Study of Income Dynamics and the Health Advisory Panel of the

Congressional Budget Office. He has testified numerous times before U.S. Congressional committees.

Dr. Skinner is a member of the Institute of Medicine of the National Academy of Sciences. He is the recipient of several research grants from institutions including the National Institute on Aging and the Robert Wood Johnson Foundation. Professor Skinner holds a Ph.D. in Economics from the University of California at Los Angeles and a B.A. in Political Science from the University of Rochester. At Dartmouth, he teaches courses in public economics.

Professor Skinner has published research on numerous health care topics, including the efficiency of the U.S. health care system, geographical variation in health care, and racial disparities in health. He has also published extensively on savings behavior, including on issues such as precautionary saving, the adequacy of retirement savings, and the effect of tax incentives on retirement savings.



In his spare time, he enjoys cross-country skiing, sailing, and traveling with his family.

Abstracts of Selected Recent NBER Working Papers

WP 15589

Hilary Hoynes, Marianne Page, Ann Huff Stevens

Is a WIC Start a Better Start? Evaluating WIC's Impact on Infant Health Using Program Introduction

The goal of federal food and nutrition programs in the United States is to improve the nutritional well-being and health of low income families. A large body of literature evaluates the extent to which the Supplemental Program for Women Infants and Children (WIC) has accomplished this goal, but most studies have been based on research designs that compare program participants to non-participants. If selection into these programs is non-random then such comparisons will lead to biased estimates of the program's true effects. In this study we use the rollout of the WIC program across counties to estimate the impact of the program on infant health. We find that the implementation of WIC led to an increase in average birthweight and a decrease in the fraction of births that are classified as low birthweight. We find no evidence that these estimates are driven by changes in fertility. Back-of-the-envelope calculations suggest that the initiation of WIC led to a ten percent increase in the birthweight of infants born to participating mothers.

WP 15607

Alan Gustman, Thomas Steinmeier

Integrating Retirement Models

This paper advances the specification and estimation of models of retirement and saving in two earner families. The complications introduced by the interaction of retirement decisions by husbands and wives have led researchers to adopt a number of simplifications to increase the feasibility of estimating family retirement models. Our model relaxes these restrictions. It includes the extended choice set created when each spouse makes an independent retirement decision. It also includes the full range of complexity found in dynamic-stochastic models of retirement deci-

sion making, so far analyzed only in the context of single earner households. Retirement outcomes include full retirement, partial retirement and full-time work. Reverse flows from states of lesser to greater work are also included. The preference structure incorporates heterogeneity in time preference, varying taste parameters for full-time and part-time work, and the possibility of changes in preferences after retirement. The opportunity set reflects the full range of nonlinearities created by pensions and Social Security. Financial returns are stochastic. Exogenous shocks such as layoffs are also included. Estimation is based on data from the Health and Retirement Study.

WP 15608

John Chalmers, Jonathan Reuter

How Do Retirees Value Life Annuities? Evidence from Public Employees

Oregon Public Employees Retirement System (PERS) retirees must choose between receiving all of their retirement benefits as life annuity payments and receiving lower life annuity payments coupled with a partial lump sum payout. For the median retiree, the expected present value of the incremental life annuity payments is 1.50 times the lump sum payout, and demand for lump sums is low. This pattern is consistent with value-maximizing decisions by retirees. However, when we exploit variation in the value of the incremental life annuity payments arising from how PERS calculates retirement benefits, we find robust evidence that demand for lump sum payouts is higher when the forgone life annuity payments are more valuable. We also find that demand for lump sum payouts is higher when the lump sum payout is "large," and when equity market returns over the prior 12 months are higher. Collectively, these findings suggest that retirees value incremental life annuity payments at less than their expected present value, either because they do not know how to accurately value life annuities or because they have strong demand for large lump sum payouts. In contrast, when we measure variation in the value of the incremental life annuity

payments along a dimension that is easier for retirees to observe and interpret—poor health at retirement—we find evidence consistent with value-maximizing decision-making.

WP 15678

David Cutler, Fabian Lange, Ellen Meara, Seth Richards, Christopher Ruhm

Explaining the Rise in Educational Gradients in Mortality

The long-standing inverse relationship between education and mortality strengthened substantially later in the 20th century. This paper examines the reasons for this increase. We show that behavioral risk factors are not of primary importance. Smoking has declined more for the better educated, but not enough to explain the trend. Obesity has risen at similar rates across education groups, and control of blood pressure and cholesterol has increased fairly uniformly as well. Rather, our results show that the mortality returns to risk factors, and conditional on risk factors, the return to education, have grown over time.

WP 15682

Raimond Maurer, Olivia Mitchell, Ralph Rogalla

The Effect of Uncertain Labor Income and Social Security on Life-Cycle Portfolios

This paper examines how labor income volatility and social security benefits can influence lifecycle household portfolios. We examine how much the individual optimally saves and where, taking into account liquid financial wealth and annuities, and stocks as well as bonds. Higher labor income uncertainty and lower old-age benefits boost demand for stable income in retirement, but also when young. In addition, a declining equity glide path with age is appropriate for the worker with low income uncertainty; for the high income risk worker, equity exposure rises until retirement. We also evaluate how differences in social security benefits can influence retirement risk management.

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WP 15691

William Encinosa, Didem Bernard, Avi Dor Does Prescription Drug Adherence Reduce Hospitalizations and Costs?

We estimate the impact of diabetic drug adherence on hospitalizations, ER visits, and hospital costs, using insurance claims from MarketScan® employer data. However, it is often difficult to measure the impact of drug adherence on hospitalizations since both adherence and hospitalizations may be correlated with unobservable patient severity. We control for such unobservables using propensity score methods and instrumental variables for adherence such as drug coinsurance levels and direct-to-consumer-advertising. We find a significant bias due to unobservable severity in that patients with more severe health are more apt to comply with medications. Thus, the relationship between adherence and hospitalization will be underestimated if one does not control for unobservable severity. Overall, we find that increasing diabetic drug adherence from 50% to 100% reduced the hospitalization rate by 23.3% ($p=0.02$) from 15% to 11.5%. ER visits are reduced by 46.2% ($p=.04$) from 17.3% to 9.3%. While such an increase in adherence increases diabetic drug spending by \$776 a year per diabetic, the annual cost savings for averted hospitalizations are \$886 per diabetic, a cost offset of \$110 ($p=0.02$), or \$1.14 per \$1 spent on drugs.

WP 15737

Xin Xu, Robert Kaestner

The Business Cycle and Health Behaviors

In this paper, we take a structural approach to investigate the effects of wages and working hours on health behaviors of low-educated persons using variation in wages and hours caused by changes in economic activity. We find that increases in hours are associated with an increase in cigarette smoking, a reduction in physical activity, and fewer visits to physicians. More importantly, we find that

most of the effects associated with changes in hours can be attributed to the changes in the extensive margin of employment. Increases in wages are associated with greater consumption of cigarettes.

WP 15744

Axel Boersch-Supan, Alexander Ludwig Old Europe Ages: Reforms and Reform Backlashes

The extent of the demographic changes in Europe is dramatic and will deeply affect future labor, financial and goods markets. The expected strain on public budgets and especially social security has already received prominent attention, but aging poses many other economic challenges that threaten growth and living standards if they remain unaddressed. This paper focuses on three large Continental European countries: France, Germany, and Italy. These countries have large pay-as-you-go pension systems and vulnerable labor markets. At the same time, they show remarkable resistance against pension and labor market reform. While there is no shortage of reform proposals to address population aging, most of those focused on pension and labor market reform, little is known about behavioral reactions to such reforms. This paper therefore sheds light on the potential benefits of pension and labor market reform for growth and living standards, taking into account behavioral reactions to specific reforms. Which behavioral reactions will strengthen, which will weaken reform policies? Can Old Europe maintain its standard of living even if behavioral reactions offset some of the current reform efforts?

WP 15781

Deliana Kostova, Hana Ross, Evan Blecher, Sara Markowitz Prices and Cigarette Demand: Evidence from Youth Tobacco Use in Developing Countries

This paper estimates the impact of cigarette prices on youth smoking in lower-income countries using data from the Global Youth Tobacco Survey (GYTS). Country-level heterogeneity is addressed with fixed effects and by directly controlling for confounding environmental factors such as local anti-smoking sentiment, cigarette advertising, anti-smoking media messages, and compliance with youth access restrictions. We find that cigarette price is an important determinant of both smoking participation and conditional demand. The estimated price elasticity of participation is -0.63. The likelihood of participation decreases with anti-smoking sentiment and increases with exposure to cigarette advertising. The estimated price elasticity of conditional cigarette demand is approximately -1.2. Neither anti-smoking sentiment, cigarette advertising, nor access restrictions have an impact on the intensity of smoking among current smokers, but exposure to anti-smoking media may reduce the number of cigarettes smoked.

WP 15805

Stavros Pangeas

Optimal Retirement Benefit Guarantees

Retirement benefit guarantees can ensure a minimum standard of living in retirement. I propose a framework to discuss the design of such guarantees. The model features a standard life-cycle setting, in which individual agents' choices can have negative external effects on public finances, whenever their retirement consumption drops below a minimum level. Within this framework, I derive two alternative forms of intervention that can efficiently deliver a minimum standard of living to retirees. According to the first policy, agents use part of their accumulated assets to purchase a claim providing a fixed income stream for the duration of their life. According to the second policy, they purchase an appropriately structured portfolio insurance policy.

NBER

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