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Lessons for Health Care from Behavioral Economics

The emerging field of behavioral economics has yielded important insights into how individuals make choices. Standard economic theory assumes that individuals are rational, forward-looking consumers who make choices so as to maximize their utility (or happiness). However, numerous laboratory and field studies now show that individuals often have difficulty making wise choices. Difficulties are particularly likely when individuals are faced with decisions that involve uncertainty, tradeoffs between current and future costs and benefits, or significant complexity.

Decisions relating to health care, such as whether to purchase health insurance, what plan to choose, and whether and when to consume health care, unfortunately exhibit all of these attributes. Yet the insights from behavioral economics generally have not been applied to the study of health care. A new working paper by researchers **Jeffrey Liebman** and **Richard Zeckhauser**, **"Simple Humans, Complex Insurance, Subtle Subsidies,"** (NBER Working Paper 14330) seeks to apply such insights.

The authors discuss the three areas where decision-making has been shown to be particularly poor, starting with the issue of uncertainty. The standard economic model suggests that individuals in effect calculate the expected utility associated with each health insurance plan, as well as that associated with not buying insurance, and then select the option that maximizes expected utility. Yet making this calculation requires assessing the probabilities, financial costs, and levels of happiness associated with possible future outcomes such as developing cancer or having a heart attack. In practice, each of these components is problematic.

The behavioral economics literature has shown that individuals make systematic mistakes in assessing probabilities. They give too much weight to salient low probability events, such as dying in a plane crash, and do not distinguishing sufficiently between a 5 percent and a 20 percent chance. It is virtually impossible for consumers to assess the financial costs associated with various health conditions, as there is no place to look up the prices charged for health services. Predicting one's level of happiness under different health conditions presents another challenge. The standard way to assess health-related utility is in quality-adjusted life years (QALYs), where the value of a year of life is reduced by a certain amount if the individual has a particular medical condition. Research has shown that individuals overestimate the amount by which their happiness will decline if they become sick (that is, assign disability states too low a QALY value).

Decision-making over time presents a second challenge. Health care choices often require incurring costs today to produce future benefits. This is true for routine preventative care as well as for more costly and invasive procedures such as the removal of certain organs or tissue to reduce cancer risk among high-risk patients. Behavioral economics has shown that given their own values, people tend to invest too little in activities like these because they put too much weight on costs today and too little weight on future benefits.

The complexity of health care decisions creates a third area of difficulty. The standard health insurance plan incorporates many attributes, including financial provisions like deductibles and copayments, as well as other factors such as different levels of coverage for different providers. Health insurance is also rife with complex cross-subsidies. For example, employees may not understand that they are sacrificing cash wages in exchange for employer premium payments, and may not know whether they are giving up an amount equal to the average premium or their own personal premium, which will depend on age, family size, and health status. Evidence from psychology indicates that people who face complex choices make poor decisions. A salient example is status quo bias (SQB), people's tendency to stick with choices made previously regardless of whether they are optimal. Given SQB, the behavioral economics literature has recently focused on the importance of default options in decision-making and the potential for using them to get individuals to make better choices.

Having analyzed the pheonomenon, the authors turn next to the implications of behavioral economics for health care policy. The first is that behavioral economics provides an additional justification for subsidizing health care. A key tenet of economic theory is that insurance leads individuals to over-consume health care by reducing the price of care to less than its marginal cost. But if individuals tend to under-consume care for reasons related to behavioral economics — for example, because they underweight the future health benefits it will provide — we are thrust into a second-best world. Under-consumption stemming from behavioral tendencies offsets the traditional distortionary effect of insurance. It is no longer certain that insurance leads to over-consumption of care.

Behavioral economics also has the potential to inform thinking about how subsidies to health care should be structured. For example, standard economic theory suggests that the point of insurance is to protect people against low-frequen-cy, high-cost events like heart attacks, not high-frequency, low-cost events like annual flu shots. But if these low-cost events are precisely those where under-consumption is greatest because the benefits primarily occur in the future, subsidizing them, including possibly paying people to get them, is warranted.

What are the lessons of behavioral economics for current policy debates? The major proposals from both the left and the right seem likely to produce at least a modest shift away from employer-provided insurance and towards a system where individuals are more responsible for making complex choices about health insurance and health care. Based on their analysis, the authors suggest four main lessons for health care reform.

First, consumers need to have their health insurance plans mediated by some entity that can screen and restrict health insurance choices down to a very limited number. The authors argue that employers are better suited for this role than is the government or private insurance agents. Second, rather than structuring insurance co-payments to make consumers face the marginal cost of care or something close to it (at least over some range of expenditures), the authors suggest that co-payments be designed using cost-effectiveness analysis. This would maximize QALYs gained relative to dollars spent. Third, efforts to cover the uninsured should reflect behavioral obstacles to coverage — for example, automatic enrollment may hold more promise than financial penalties as a way to increase coverage. Finally, information gathering on the effects of behavioral interventions should be increased in order to promote the more sensible design of health policy.

As the authors conclude, behavioral economics "enables us to predict the biases that afflict individuals' poor decisions, to know what measures can counteract them, and thereby to produce better choices for insurance and care by individuals. QALYs are waiting to be reaped."

The Future of American Fertility

The population fertility rate is an important determinant of the future needs of the population, since the fertility rate largely determines the age structure of the population. A sudden rise in the fertility rate will increase the demand for childcare and schools. A decline in the fertility rate will put more pressure on programs such as Social Security that are directed towards older people and funded on a pay-as-you-go basis.

In **"The Future of American Fertility"** (NBER Working Paper 14498), researchers **Samuel Preston** and **Caroline Hartnett** review the major social and demographic forces influencing American fertility levels.

The authors first distinguish between two total fertility rate (TFR) measures, the period rate and the cohort rate. The more commonly-used period TFR is a snapshot of fertility at one point in time, as it is the number of children a woman would have over her lifetime if at every age she experienced the age-specific fertility rate observed at that point in time. The cohort TFR is average number of children ever born to an actual cohort of women who have completed their childbearing years. The period TFR can be calculated for recent years, because it is not necessary for women to have completed their childbearing in order for their data to be used. However, during a period when the average age at childbearing is rising, as is happening now, the period TFR will be lower than the cohort TFR because it underestimates the extent of childbearing at older ages that will occur in a cohort.

The authors begin their analysis by exploring trends in fertility. The TFR (period or cohort) fell continuously from 1820 to 1975, with the single exception of the post-World War II baby boom. By the late 1970s, the cohort TFR was slightly below the figure of 2.08 children per woman that is needed in order for each generation to exactly replace itself, although the TFR has risen modestly in the last several years

Recent (post-WWII) declines in fertility can be attributed more to changes in family size than to increases in childlessness. For women born in the mid-1930s, families of four or more children were by far the most common family type, accounting for over one-third of women. Thirty years later, this figure had fallen to about 10 percent, while families with two children had become the most common family type.

In recent years, marriage has come to be viewed as less important for childbearing. While only 5 percent of births in 1960 were out-of-wedlock, that figure had risen to 37 percent by 2005. The nature of marriage itself changed during this period as a result of women's improved economic opportunities and greater access to contraception. Women and men became more similar in their activities, with women working more and men doing more housework, These changes no doubt contributed to fertility declines, yet the fact that fertility rates have leveled off and even risen modestly in recent years suggests that bearing children remains a "powerful goal of most American women."

Next, the authors explore the individual-level characteristics associated with fertility in the U.S. Previous research has established that women's educational attainment is negatively associated with fertility in many societies. The authors show that while this is the case in the U.S., the strength of this relationship has been falling over time, even as educational

differentials in women's earnings became much steeper.

A second key characteristic is ethnicity. Tabulating the TFR by ethnic group, the authors show that while the TFR of non-Hispanic whites is below that of Hispanics, it would still rank near the top of TFRs of other developed countries. Thus the U.S.'s relatively high TFR is not due exclusively to high fertility among minorities. When the authors estimate the effect of ethnicity on fertility controlling for education and age, they find that non-Hispanic blacks and Hispanics have higher fertility rates than whites. This gap is shrinking for blacks, but rising for Hispanics. Upon closer examination, the rising fertility gap with respect to Hispanics results from a shift in the composition of the Hispanic population away from Cubans and Puerto Ricans, who have relatively low TFRs, and towards Mexican Americans, who have high TFRs.

The authors also explore geographic differences in fertility across the U.S.. They use geographic differences to estimate the effect of male and female wages on fertility. They find that fertility decreases with women's earnings in an area, but rises with men's earnings. As they note, these findings should be interpreted cautiously due to the possibility of selective migration.

The authors briefly consider why U.S. fertility rates are higher than those of all other developed countries. The U.S. may have adapted to the rise in women's wages in ways that better allowed women to combine work with childbearing, for example by introducing longer store hours to increase shopping opportunities or by providing more flexible work schedules. Changes in views on appropriate sex roles within marriage and the necessity of marriage for childbearing may also have kept U.S. fertility rates relatively high. Greater religiosity in the U.S. may also play a role, given that religious practice is positively related to fertility.

The authors conclude by considering the implications of their findings for the future of American fertility. Their estimates suggest that predictable future changes in the ethnic composition and educational attainment of the population will have small, offsetting effects on the TFR, leaving it essentially unchanged. Continued growth in women's relative earnings could lead to a somewhat larger decrease in the TFR, though this estimate may be an upper bound on the true effect. The eventual end of the rise in average childbearing age will lead to an increase in the period (though not cohort) TFR. Finally, the authors caution that elements of "social contagion" such as those that drove the baby boom and bust could add substantial volatility to the future TFR, but these cannot be predicted or accounted for in the approach they have employed.

Forecasting Health Care Costs

Along with the problem of the uninsured, rising health care costs are the largest challenge facing the U.S. health care system today. Health care costs rose steadily during the latter half of the 20th century, from 5 percent of GDP in 1950 to over 15 percent today. Experts agree that costs will continue to rise over the next half century, putting pressure on government, businesses, and individuals, although there is no clear consensus on how high costs might go.

A new working paper by **Robert Fogel, "Forecasting the Cost of U.S. Health Care in 2040"** (NBER Working Paper 14361), examines several factors that are likely to be important in determining how fast health care costs rise in the future.

The first factor is trends in age-specific prevalence rates of chronic diseases and disabilities. Prevalence rates declined during the 20th century, and the rate of decline has increased in recent years, from about 1 percent per year between 1910 and 1980 to about 2 percent per year by the end of the century. Advances in health care have clearly contributed to the decline in prevalence rates, though it is difficult to determine what share of the decline is due to health care versus other factors such as improved nutrition.

To determine whether declines in age-specific prevalence rates will reduce health care expenditures, it is necessary to weight the existence of a particular chronic disease by the cost of treating it, which generally rises with age. The author shows that the financial burden of health care per capita (relative health care costs) rises slowly in the 50s and then accelerates at a faster and faster rate in each successive decade. The financial burden at ages 85 and above is 6 times higher than that at ages 50-54 and nearly twice as high as that at ages 75-79.

The critical question is what is likely to happen to the relative burden of health care over the next generation. One possibility is that the curve will shift downward, which would occur if prevalence rates declined by the same rate at all ages. A second possibility is that the curve will shift to the right, which would occur if the average age of onset of chronic conditions were delayed, say by five years.

Recent epidemiological studies support the latter theory. Moreover, when the author graphs relative Medicare expenditures by years until death, he finds that costs rise sharply in the last two years before death and that this pattern has remained unchanged over the past two decades. These findings suggests that the delay in the onset of chronic diseases is not likely to reduce health care expenditures—individuals will have more years in good health, but when they do eventually become ill they will incur large medical expenses.

Next, the author examines trends in life expectancy. Many experts predict that increases in life expectancy in the 21st century will be much lower than in the 20th—for example, the U.S. Census Bureau predicts an increase of 13 years this century, versus 30 to 40 years in the last century. One reason for the relatively low projection is the view that reductions in death rates under age 5 offer the best opportunity for large increases in life expectancy, and these rates are already very low in the U.S.

Yet as the author notes, other arguments point to a larger increase. Record life expectancy, the highest life expectancy experienced by any country at each point in time, has risen by 2.4 years per decade

for women (and 2.2 years for men) over the past 160 years. If this trend were to continue, female life expectancy in the U.S. in 2070 would be between 92.5 and 101.5 years, substantially higher than what many predict. The accelerating decline in chronic disease prevalence and favorable changes in body size (such as the decline in waist-to-hip ratio, which measures abdominal fat) also suggest that gains in life expectancy in this century will be fairly large.

A third factor affecting future health care costs is the increase in the share of the population over age 65. As per capita health expenditures rise with age, the aging of the population will lead to an increase in health care expenditures. However, the author argues that this will be only a minor factor in the rise in health care costs over the coming decades.

A more significant factor is likely to be the rise in demand for health care that comes with rising incomes. The author calculates the long-term income elasticity of demand for health care to be 1.6. Applying this figure to projections of U.S. income growth implies that health care expenditures will rise from about 15 percent of GDP today to 29 percent of GDP in 2040. This increase isn't necessarily a bad thing if the value of the health gains that result from these higher expenditures is greater the expenditures themselves, as several recent studies suggest.

The author concludes, "Public policy should not be aimed at suppressing the demand for health care. Expenditures on health care are driven by demand, which is spurred by income and by advances in biotechnology that make health interventions increasingly effective. Just as electricity and manufacturing were the industries that stimulated the growth of the rest of the economy at the beginning of the 20th century, health care is the growth industry of the 21st century."

NBER Profile: *Ronald Lee*

Ronald Lee is a Research Associate of the NBER's program in aging.

Lee is a Professor of Demography and Economics at the University of California, Berkeley. At Berkeley, Professor Lee holds the Edward G. and Nancy S. Jordan Endowed Chair in Economics and is the Director of the Center on the Economics and Demography of Aging and of training grants from NIA and NICHD. Prior to joining the Berkeley faculty, Professor Lee taught at the University of Michigan.

Professor Lee holds a Ph.D. in Economics from Harvard University and an M.A. in Demography from the University of California, Berkeley. He spent a postdoctoral year at the National institute of Demographic Studies (INED, France). He received his B.A. in philosophy from Reed College, after which he served for two years in the Peace Corps in Ethiopia where he taught math, physics and history in high school.

Professor Lee's current research includes the National Transfer Accounts (NTA) project, which is directed jointly with Andrew Mason. This project estimates the aggregate flows of income from one age group to another cross-sectionally through public and private transfers, and across age and time through assets, for nations around the world. These data then form the basis for comparative international studies of transfer systems, how they differ across levels of economic development, cultures, institutions and government policy environments, and how they are stressed by changing population age distributions across the demographic transition and as projected into the future. This project starts by estimating age profiles of consumption and labor income, and considering their variations across countries and over time.

Lee also works on the evolutionary theory of life histories. Why has a U-shaped age pattern of mortality evolved for many species including humans? Why do humans and a few other species have extensive post-reproductive survival? How are these patterns related to intergenerational transfers and parental investment in offspring? Why is human fertility so low? These and related questions are investigated using various methods including dynamic optimization, comparative steady states, and micro-simulation of populations subject to mutations that affect their age specific mortality, and that live in groups within which food is shared, as did our hunter-gatherer forebears.

Professor Lee has received the Population Association of America's Irene B. Taeuber Award for outstanding contributions in the field of demography and the Mindel C. Sheps Award for research in Mathematical Demography. He has received numerous research grants from the National Institute on Aging including two MERIT awards, as well as grants from the National Institute of Child Health and Human Development and the Social Security Administration.

Professor Lee is an elected member of the National Academy of Sciences, the American Association for the Advancement of Science, the American Academy of Arts and Sciences, and the American Philosophical Society, and is a Corresponding Fellow of the British Academy. He is a past President of the Population Association of America, has chaired the population and social science study section for the National Institutes of Health, and has served on the NIA Council and is currently on the NICHD Council. He is an Associate Editor of the *Journal of Population Economics* and the *Review of Economics of the Household* and a member of the Editorial Board of the *Journal of Population Ageing*.

His wife is Melissa Nelken, and they have three daughters. In his spare time, he enjoys tennis and hiking.

Abstracts of Selected Recent NBER Working Papers

14231

John B. Shoven, Gopi Shah Goda
Adjusting Government Policies for Age Inflation

Government policies that are based on age do not adjust to the fact that a given age is associated with a higher remaining life expectancy and lower mortality risk relative to earlier time periods due to improvements in mortality. We examine four possible methods for adjusting the eligibility ages for Social Security, Medicare, and Individual Retirement Accounts to determine what eligibility ages would be today and in 2050 if adjustments for mortality improvement were taken into account. We find that historical adjustment of eligibility ages for age inflation would have increased ages of eligibility by approximately 0.15 years annually. Failure to adjust for mortality improvement implies the percent of the population eligible to receive full Social Security benefits and Medicare will increase substantially relative to the share eligible under a policy of age adjustment.

14296

Claudio Lucarelli, Jeffrey Prince, Kosali Simon
Measuring Welfare and the Effects of Regulation in a Government-Created Market: The Case of Medicare Part D Plans

Medicare's prescription drug benefit (Part D) has been its largest expansion of benefits since 1965. Since the implementation of Part D, many regulatory proposals have been advanced to improve this government-created market. Among the most debated are proposals to limit the number of options, in response to concerns that there are "too many" plans. In this paper we study the welfare impacts of limiting the number of Part D plans. To do this, we first provide evidence that consumers view Medicare Part D plans as differentiated products. In doing so, we determine how much Medicare beneficiaries value the plans' various features — an important measurement not only for our analysis, but also because these features are heavily dictated by policy. Second, using our demand- and supply-side estimates, we conduct several policy experiments to understand the implications of reducing the number of plans. Specifically, we assess the effects on equilibrium premia and welfare from removing plans that cover "the gap," reducing the maximum number of plans each firm can offer per region, and, for validation purposes, the impact of a recent major merger. Our counterfactuals regarding removal of plans provide an important assessment of the losses to consumers (and producers) resulting from government limitations on choice. These costs must be weighed against the widely discussed expected gains from limiting options (due to expected reductions in consumer search costs) when considering new restrictions on the number of plans that can be offered. We find that the search costs should be at least two thirds of the average monthly premium in order to justify a regulation that allows only two plans per firm, and that this number would be substantially lower if the limitation in the number of plans is coupled with a decrease in product differentiation (e.g., by removing plans that cover "the gap").

14309

John Cogan, R. Glenn Hubbard, Daniel Kessler
The Effect of Medicare Coverage for the Disabled on the Market for Private Insurance

Subsidies for health insurance for chronically ill, high-cost individuals may increase coverage in the broader population by improving the functioning of insurance markets. In this paper, we assess an historical example of a policy intervention of this sort, the extension of Medicare to the disabled, on the private insurance coverage of non-disabled individuals. We use data on insurance coverage from the Panel Study of Income Dynamics from before and after the extension of Medicare to the disabled to estimate the effect of the program on private insurance coverage rates in the broader population. We find that the insurance coverage of individuals who had a health condition that limited their ability to work increased significantly in states with high versus low rates of disability. Our findings suggest that that subsidizing individuals with high expected health costs is an effective way to increase the private insurance coverage of other high-cost individuals.

14350

Hai Fang, Nolan Miller, John Rizzo, Richard Zeckhauser
Demanding Customers: Consumerist Patients and Quality of Care

Consumerism arises when patients acquire and use medical information from sources apart from their physicians, such as the Internet and direct-to-patient advertising. Consumerism has been hailed as a means of improving quality. This need not be the result. Consumerist patients place additional demands on their doctors' time, thus imposing a negative externality on other patients. Our theoretical model has the physician treat both consumerist and ordinary patient under a binding time budget. Relative to a world in which consumerism does not exist, consumerism is never Pareto improving, and in some cases harms both consumerist and ordinary patients. Data from a large national survey of physicians shows that high levels of consumerism are associated with lower perceived quality. Three different measures of quality were employed. The analysis uses instrumental variables to control for the endogeneity of consumerism. A control function approach

is employed, since our dependent variable is ordered and categorical, not continuous.

14354
Anna Aizer
Peer Effects and Human Capital Accumulation: the Externalities of ADD

Although recent work has shown that peers affect human capital accumulation, the mechanisms are not well understood. Knowing why high achieving peers matter, because of their innate ability, disciplined behavior or some other factor, has important implications for our understanding of the education production function and for how we organize schools and classrooms. In this paper I provide evidence that peer behavior is an important mechanism. To identify the impact of peer behavior on achievement separate from ability or other characteristics, I exploit exogenous improvements in classmates' inattention/impulsivity that result from a diagnosis of ADD. After children with ADD are diagnosed, I show that their behavior improves, but that no other characteristics, including achievement, change. I find that peer behavior significantly affects cognitive achievement and that resources such as class size can overcome the negative peer effects observed, consistent with the model of education production proposed by Lazear (2001). These findings have important implications for our understanding not only of peer effects but also of the relationship between health, productivity and growth.

14406
Jessica Cohen, Pascaline Dupas
Free Distribution or Cost-Sharing? Evidence from a Malaria Prevention Experiment

It is often argued that cost-sharing — charging a subsidized, positive price — or a health prod-
uct is necessary to avoid wasting resources on those who will not use or do not need the product. We explore this argument through a field experiment in Kenya, in which we randomized the price at which prenatal clinics could sell long lasting anti-malarial insecticide-treated nets (ITNs) to pregnant women. We find no evidence that cost-sharing reduces wastage on those that will not use the product: women who received free ITNs are not less likely to use them than those who paid subsidized positive prices. We also find no evidence that cost-sharing induces selection of women who need the net more: those who pay higher prices appear no sicker than the average prenatal client in the area in terms of measured anemia (an important indicator of malaria). Cost-sharing does, however, considerably dampen demand. We find that uptake drops by 75 percent when the price of ITNs increases from zero to $0.75 (i.e. from 100 to 87.5 percent subsidy), the price at which ITNs are currently sold to pregnant women in Kenya. We combine our estimates in a cost-effectiveness analysis of ITN prices on child mortality that incorporates both private and social returns to ITN usage. Overall, our results suggest that free distribution of ITNs could save many more lives than cost-sharing programs have achieved so far, and, given the large positive externality associated with widespread usage of ITNs, it would likely do so at a lesser cost per life saved.

14428
Douglas Almond, Bhashkar Mazumder
The Effects of Maternal Fasting During Ramadan on Birth and Adult Outcomes

We use the Islamic holy month of Ramadan as a natural experiment for evaluating the short and long-term effects of fasting during pregnancy. Using Michigan natality data we show that in utero exposure to Ramadan among Arab
births results in lower birthweight and reduced gestation length. Preconception exposure to Ramadan is also associated with fewer male births. Using Census data in Uganda we also find that Muslims who were born nine months after Ramadan are 22 percent ($p = 0.02$) more likely to be disabled as adults. Effects are found for vision, hearing, and especially for mental (or learning) disabilities. This may reflect the persistent effect of disruptions to early fetal development. We find no evidence that negative selection in conceptions during Ramadan accounts for our results. Nevertheless, caution in interpreting these results is warranted until our findings are corroborated in other settings.

14462
Dora Costa
The Rise of Retirement Among African Americans: Wealth and Social Security Effects

I examine the effects of an unearned income transfer on the retirement rates and living arrangements of a very poor population by studying the effects of pensions on the decisions of black Union Army veterans. I find that blacks were 2 to 5 times as responsive as whites to income transfers in their retirement decisions and 6 to 8 times as responsive in their choice of independent living arrangements. I argue that blacks' greater poverty explains their responsiveness to pensions. My findings have implications for understanding racial differences in trends in retirement and independent living. I show that the retirement rates of both blacks and whites rose between 1900 and 1930 but that convergence in black and white rates and in living arrangements only occurred between 1930 and 1950. I argue that income effects from the institution of Social Security explain up to half of the convergence in black-white retirement rates and in living arrangements.