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# NBER NATIONAL BUREAU OF ECONOMIC RESEARCH

## BULLETIN ON AGING AND HEALTH

### Incentives in the Medicare Prescription Drug Benefit

The introduction of Medicare's new Part D prescription drug benefit is perhaps the most significant expansion of the program since its inception in 1965. The cost of the drug benefit for 2004-2013 is projected to be \$410 Billion. As of mid-April 2006, 19.7 million Medicare beneficiaries were enrolled in a Part D plan, including 8.1 million beneficiaries who signed up for new stand-alone prescription drug plans (PDPs).

While private insurance markets have generally failed to provide stand-alone prescription drug insurance, there are several features that may allow Medicare to succeed. First, the Centers for Medicare and Medicaid Services (CMS) can impose mandatory minimum quality standards, as CMS must approve each PDP's formulary, or the specific drugs covered by the plan. Second, the program is heavily subsidized, with Medicare paying 74.5% of total plan premiums plus 80% of catastrophic costs (annual drug costs exceeding \$5,100). Third, payments to providers are risk-adjusted, meaning that they are adjusted up or down based on the expected cost of patients enrolled in the plan. This can help to avoid a "race to the bottom," whereby providers design their plans to make them unappealing to costly patients.

As the market for PDPs is brand new, it remains to be seen whether it will function as lawmakers envision. In "**Perverse Incentives in the**

**Medicare Prescription Drug Benefit,"** (NBER Working Paper 12008), **David McAdams** and **Michael Schwarz** examine issues in the design of the new drug benefit that may put upward pressure on drug prices and downward pressure on drug plan quality.

One issue the authors examine is risk adjustment. Although risk adjustment is commonly used for traditional health insurance plans, the authors suggest that it may be more problematic in the case of PDPs. If risk adjustment is very fine, for example based on a specific drug a patient is taking, then the manufacturer of that drug has an incentive to raise its price, knowing that the provider has little incentive to encourage the patient to switch to a lower-cost substitute given that Medicare will reimburse most of the cost.

This might suggest that coarse risk adjustment is preferable, but this too has drawbacks. If patients with different pre-existing conditions receive the same risk adjustment, PDP providers will have an incentive to discourage patients with the more costly condition from joining their plan. This is easy for providers to do, for example by moving a specific drug to a different tier or adding it to a pre-approval list. CMS has said that it will monitor plans to identify those that are outliers in terms of what drugs they exclude; however, if many plans engage in this behavior, it will not be easy to identify discriminatory PDPs in this manner.

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While risk adjustment is probably a necessary part of any reimbursement scheme, the authors argue that the drug benefit could be improved by having all PDPs charge the same premium, which would be determined based on the amount budgeted by Congress. This would have the obvious advantage of eliminating uncertainty about the total cost of the program. Moreover, the authors contend that there would be less upwards pressure on price and downwards pressure on quality in such a scheme.

With a fixed price, providers would try to assemble the most generous formulary possible within their budget. This would put pressure on drug manufacturers to keep prices low so that their drugs would be included. In terms of quality, the race to the bottom occurs when providers offer

cheaper and less generous plans to appeal to healthier patients. With premiums fixed, less generous plans would be less attractive to all seniors.

The authors envision that CMS will need to actively regulate PDPs. They note that this is particularly likely in the case of “fuzzy-line” rules, such as that PDPs must cover all drugs “presenting unique and important therapeutic advantages” or “most commonly used by the Medicare population.” Providers are likely to interpret such requirements narrowly and offer a limited formulary, in order to extract

greater price concessions for drugs that are included in the formulary. This may lead CMS to demand that more drugs be covered, which increases the upwards price pressure for drugs.

Another fuzzy-line rule is that PDPs may not discriminate against specific groups of patients. Since patients with a certain condition may all rely on a particular drug, enforcing this rule may lead CMS to mandate that specific drugs be covered by all PDPs, which can be expected to raise the drugs’ price. As a final example, since Medicare will pay up to 80% of the dif-

ference between a PDP’s projected and actual costs, CMS will need to be very involved in setting methods for projecting plan costs.

The authors conclude that “CMS will have to continue to closely regulate the benefit, especially formulary design, for the foreseeable future. Any minimum standard that CMS imposes on formularies, however, will put additional upward pressure on drug prices. Ultimately, this could jeopardize the benefit’s budgetary viability.”

## How Do Lifecycle Investment Strategies Affect the Distribution of Retirement Wealth?

The typical employer-provided pension has changed dramatically over the past twenty years. The fraction of private-sector employers offering defined benefit (DB) plans, in which employees receive a fixed benefit determined by a formula, has declined, while there has been a sharp increase in the fraction offering defined contribution (DC) plans such as 401(k)s, in which the employer’s contribution is specified but benefits depend on asset returns. Among employees with pensions, the share with DC plans rose from 40 percent in 1983 to 79 percent in 1998, while the share with DB plans fell from 87 percent in 1983 to 44 percent in 1998.

This change has shifted responsibility for managing retirement assets to employees, who must now decide how to allocate assets across broad asset classes and many different financial products. Many policy analysts and others have raised questions about whether DC plan participants are sufficiently well-informed to make these decisions, which have very important consequences for retirement wealth accumulation.

In response to these concerns, some plan sponsors have begun to offer investment options that simplify investment decision-making. One such option is the “lifecycle fund,” which automatically adjusts the portfolio allocation depend-

ing on the participant’s age or years until retirement, typically shifting assets from stocks to bonds and cash as participants age. These funds have grown rapidly in the past decade, with \$47 Billion held in such funds in 2005 and nearly 40 percent of all 401(k) plans offering them.

In “**Lifecycle Asset Allocation Strategies and the Distribution of 401(k) Retirement Wealth**” (NBER Working Paper 11974), **James Poterba, Joshua Rauh, Steven Venti, and David Wise** examine how different asset allocation strategies affect the distribution of retirement wealth. In their analysis, the authors contrast lifecycle strategies

earnings histories for 1,400 households. They assume that households contribute nine percent of their earnings to the plan each year, starting at age 28 until retirement at age 63. Next, they randomly assign return histories to these contribution paths, based on the empirical distribution of returns from 1926 to 2002. Each household is run through this simulation 200,000 times, to generate a distribution of possible retirement wealth outcomes.

Over this period, large-cap U.S. stocks had an average annual real return of 9.0 percent and a standard deviation of 20.7 percent, while long-term U.S. government bonds had an average real return on 3.2 percent and a standard deviation of 10.0 percent. Treasury Inflation-Protected Securities (TIPS), which were only introduced recently, are assumed to provide a 2 percent real riskless return.

The authors examine a number of asset allocation strategies, including investing solely in one assets (TIPS, government bonds, or stock), investing in stocks and bonds in fixed proportions, and the “No Lose” strategy proposed by Martin Feldstein, which calls for making sufficient investments in TIPS to guarantee assets of at least the amount originally contributed then investing the remainder in stock. They also consider several lifecycle options, either investing a fixed

with investment rules that allocate the portfolio across assets in fixed percentages and do not vary with age.

To conduct this analysis, the authors must model the path of plan contributions over an individual’s working life and combine this with information on asset returns. They start with real

Investment Strategy	Mean Return (\$000s)	1st Percentile Return (\$000s)
100% TIPS	162.6	162.6
100% Government Bonds	192.7	36.3
100% Stocks	812.0	12.8
(110-Age)% Stocks, rest TIPS	303.6	54.3
(110-Age)% Stocks, rest Bonds	337.4	38.0
Empirical Lifecycle, Stocks and TIPS	405.3	64.3
Empirical Lifecycle, Stocks and Bonds	438.2	37.3
Fixed Proportions (53% Stocks, 47% Bonds)	404.9	35.9
"No Lose" Plan	420.3	113.8

percentage (110 minus age of household head) of assets in stock and the rest in TIPS or bonds or picking the stock share to mimic typical lifecycle funds on the market.

The results of this analysis are shown on Table 1; these results are for households with a high school degree but no college degree, but the relative ranking of different strategies is similar for other education groups.

Among those strategies that focus exclusively on one asset, investing all assets in stocks yields a much higher average return, \$812,000 vs. \$162,600 for TIPS or \$192,700 for bonds. However, one percent of the time, the all-stock portfolio returns just \$12,800 or less, while the TIPS strategy is guaranteed to return \$162,600. In the four lifecycle funds, average returns fall between the all-stock and the all-bonds or all-TIPS

values, varying between \$303,600 and \$438,200. The first percentile values are much higher than in the all-stock case, varying between \$37,300 and \$64,300. The lifecycle funds achieve very similar results to the fixed stocks and bonds portfolio, both in average and 1<sup>st</sup> percentile return. Finally, the “no lose” plan offers a similar average return to the lifecycle funds but much higher 1<sup>st</sup> percentile return.

Noting that some analysts question the assumption that future stock returns will be as high as they have been in the past, the authors repeat their analysis lowering the average stock return by 3 percent. Naturally, the average return on the all-stock portfolio falls, to \$404,800, and the 1<sup>st</sup> percentile return also falls to \$7,300. As the authors note, “this emphasizes the risk associated with holding stocks: a very small chance of a

very poor outcome.” The average return for all strategies holding stocks fall, but the “no lose” strategy falls more than the lifecycle funds because it has relatively more stock exposure.

Finally, the authors incorporate these results into an expected utility model, to see which portfolio is preferred by households when you incorporate their aversion to risk. They find that at modest levels of risk aversion, the all-stock portfolio is preferred. However, the “no lose” and lifecycle plans become more attractive for investors with high levels of risk aversion and when the expected return on stocks is reduced relative to the expected return on bonds.

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## The Determinants of Mortality

Robert Lucas once famously said regarding the determinants of economic growth, “once one starts to think about them, it is hard to think of anything else.” The same could be said for the determinants of mortality, since the length of life is as critical a measure of our well-being as is our income.

In “**Determinants of Mortality**” (NBER Working Paper 11963), **David Cutler, Angus Deaton, and Adriana Lleras-Muney** explore many aspects of this important topic, including the decline in mortality rates over time, differences in mortality across countries, and differences in mortality across groups within countries.

For most of human history, life expectancy has been short – perhaps 25 years for our hunter-gatherer ancestors and only 37 years for residents of England in 1700. Dramatic changes began in the 18<sup>th</sup> century, with life expectancy in England rising to 41 years by 1820, 50 years by the early 20<sup>th</sup> century, and 77 years today. The decline in mortality rates was particularly sharp among children. This can be explained

by the near elimination of deaths from infectious diseases, formerly the most common cause of death, since the young are most susceptible to infection.

Weighing the various explanations for these mortality reductions, the authors see three phases. From the mid-18<sup>th</sup> century to the mid-19<sup>th</sup> cen-

al of waste, and advice about personal health practices all led to lower mortality rates, though urbanization had the opposite effect, due to high mortality rates in cities. Since the 1930s, mortality reductions have been driven primarily by medicine, first by vaccination and antibiotics and later by the expensive and intensive interventions that characterize modern medicine.

Looking across countries, there are vast differences in life expectancy, as illustrated in Figure 1. There are also sharp differences in who dies and from what. Deaths among children account for 30 percent of deaths in poor countries but less than 1 percent of deaths in rich countries. Most deaths in rich countries are from cancers and cardiovascular disease, while most deaths in poor countries are from infectious diseases.

Though differences persist, many poorer countries have recently experienced large improvements in life expectancy. In India and China, life expectancy has risen by 30 years since 1950. Even in Africa, life expectancy rose by 13 years from the early 1950s until the late 1980s, when the spread of

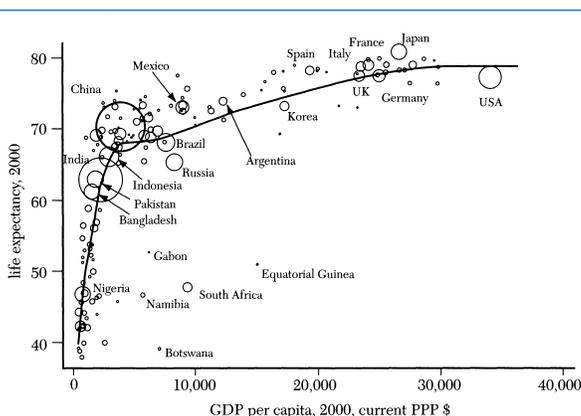


Figure 1. The Preston Curve: Life Expectancy versus GDP Per Capita

Source: World Development Indicators CD-ROM, World Bank (2002)  
Note: Circles are proportional to population and some of the largest (or most interesting) countries are labeled. The solid line is a plot of a population-weighted nonparametric regression. Luxembourg, with per capita GDP of \$50,061 and life expectancy of 77.04 years, is excluded.

improved nutrition and economic growth played a large role, as did emerging public health measures. From the mid-19<sup>th</sup> century to the early 20<sup>th</sup> century, the delivery of clean water, remov-

HIV/AIDS reversed the trend.

What factors explain these reductions in mortality rates? Some of the leading candidates are changes in income, literacy (particularly among women), and the supply of calories, as well as public health interventions such as immunization campaigns, improvements in water supply, and the use of antibiotics. Although it seems logical that economic growth should improve health, the authors point out that the evidence for this is mixed at best. This may be because urbanization often goes along with growth, or because growth must be accompanied by effective public health measures in order to bring about mortality reductions.

Within developed countries such as the U.S., there are well-documented

differences in mortality rates by race, income, education, occupation, or urban/rural status, with the low socioeconomic status groups exhibiting higher mortality rates. Some explanations for these inequalities include differences in access to medical care, in access to the resources needed to buy food and shelter, in health-related behaviors such as drinking and smoking, or in levels of “psychosocial stress.” While the link between social status and health is likely not due to any single factor, it does seem to be primarily a result of health affecting income rather than the reverse. Education seems to have a positive effect on health, which may result from differential use of health knowledge and technology.

Is there a universal theory of mortal-

ity that can explain improvements over time, differences across countries, and differences across groups? The authors argue that “knowledge, science, and technology are the keys to any coherent explanation,” perhaps controversially downplaying the role of income. As for the future, they predict that an acceleration in the production of new knowledge and treatments is likely to increase inequality in health outcomes in the short run, but the silver lining is that “help is on the way, not only for those who receive it first, but eventually for everyone.”

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## NBER Profile: Michael D. Hurd

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Michael D. Hurd is a Research Associate in the NBER's Aging program.

Hurd is a Senior Economist and the Director of the RAND Center for the Study of Aging. Prior to joining RAND, he spent thirty years on the faculties at SUNY-Stony Brook and Stanford University.

Hurd is presently a co-Principal Investigator for the Health and Retirement Study (HRS) and was a co-Principal Investigator for the Study of Asset and Health Dynamics among the Oldest-Old (AHEAD) during the 1990s. He has an extensive record of service as an expert consultant to the National Institutes of Health, the Social Security Administration, and the National Research Council. He is a recipient of a Ford Foundation Career Fellowship, a Mellon Fellowship, and a Hoover Institution National Fellowship.

He received a Ph.D. in Economics

and a M.S. in Statistics from the University of California at Berkeley and a B.S. in Electrical Engineering from the University of Utah.

Hurd's research interests encompass many issues in the economics of aging, including retirement, consumption and wealth, and mortality risk. Some of his recent work explores the drop in consumption at retirement, examines the validity of subjective survival probabilities and their effect on Social Security claiming and on bequests, and tackles issues of measuring consumption and wealth accurately in survey data.

He is married to Susann Rohwedder, who also studies the economics of aging, and they have co-authored a number of papers. He and Susann enjoy music, especially opera, hiking, good food and wine, and spending time with their extended families.



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## Abstracts of Selected Recent NBER Working Papers

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**WP 11902**

**Phillip J. Cook, Bethany Peters**  
**The Myth of the Drinker's Bonus**

Drinkers earn more than non-drinkers, even after controlling for human capital and local labor market conditions. Several mechanisms by which drinking could increase productivity have been proposed but are unconfirmed; the more obvious mechanisms predict the opposite, that drinking can impair productivity. In this paper we reproduce the positive association between drinking and earnings, using data for adults age 27-34 from the National Longitudinal Survey of Youth (1979). Since drinking is endogenous in this relationship, we then estimate a reduced-form equation, with alcohol prices (proxied by a new index of excise taxes) replacing the drinking variables. We find strong evidence that the prevalence of full-time work increases with alcohol prices—suggesting that a reduction in drinking increases the labor supply. We also demonstrate some evidence of a positive association between alcohol prices and the earnings of full-time workers. We conclude that most likely the positive association between drinking and earnings is the result of the fact that ethanol is a normal commodity, the consumption of which increases with income, rather than an elixir that enhances productivity.

**WP11934**

**W. Kip Viscusi**  
**Regulation of Health, Safety, and Environmental Risks**

This paper provides a systematic review of the economic analysis of health, safety, and environmental regulations. Although the market failures that give rise to a rationale for intervention are well known, not all market failures imply that market risk levels are too great. Hazard warnings policies often can address informational failures. Some market failures may be exacerbated by government policies, particularly those embodying conservative risk assessment practices. Labor market estimates of the value of statistical life provide a useful reference point for the efficient risk tradeoffs for government regulation. Guided by restrictive legislative mandates, regulatory policies often strike a quite different balance with an inordinately high cost per life saved. The risk-risk analysis methodology enables analysts to assess the net safety implications of policy efforts. Inadequate regulatory enforcement and behavioral responses to regulation may limit their effectiveness, while rising societal wealth will continue to generate greater levels of health and safety.

**WP 11956**

**Jayachandran N. Variyam, John Cawley**  
**Nutrition Labels and Obesity**

The Nutrition Labeling and Education Act (NLEA) imposed significant changes in the information about calories and nutrients that manufacturers of packaged foods must provide to consumers. This paper tests whether the release of this information impacted body weight and obesity among American adults. We estimate the effect of the new label using a difference-in-differences method. We compare the change before and after the implementation of NLEA in body weight among those who use labels when food shopping to that among those who do not use labels. In National Health Interview Survey data we find, among non-Hispanic white women, that the implementation of the new labels was associated with a decrease in body weight and the probability of obesity. Using NLEA regulatory impact analysis benchmarks, we estimate that the total monetary benefit of this decrease in body weight was \$63 to \$166 billion over a 20-year period, far in excess of the costs of the NLEA.

**WP 11964**

**Jeffrey Brown, James Poterba**  
**Household Ownership of Variable Annuities**

Variable annuities have been one of the most rapidly growing financial products of the last two decades. Between 1996 and 2004, nominal sales of variable annuities in the U.S. more than doubled, from \$51 billion to \$130 billion. Variable annuities now account for approximately nearly two thirds of annuity sales. The investment returns associated with variable annuities resemble those from mutual funds, and variable annuity buyers can select among a range of asset allocation options. Variable annuities are considered insurance products under the tax law, so buyers are not taxed on their investment returns until they make withdrawals from their variable annuity accounts. This paper describes the tax treatment of variable annuities, presents summary information on their ownership patterns, and explores the importance of several distinct motives for household purchase of variable annuities. The discussion of tax treatment examines the impact of the 2001 and 2003 tax bills on the relative tax treatment of variable annuities and other financial products. Household data from the 1998 and 2001 Survey of Consumer Finances shows that variable annuity ownership is highly concentrated among high income and high net wealth sub-groups of

the population. Variable annuity ownership is less concentrated, however, than ownership of several other types of financial assets. Evidence on the role of tax incentives in encouraging ownership of variable annuities is mixed. The probability of owning a variable annuity rises with the marginal tax rate throughout most of the income distribution, but it is lower for households in the top tax bracket than for those with slightly lower tax rates.

**WP 11977**

**Anthony T. Lo Sasso, Bruce D. Meyer**  
**The Health Care Safety Net and Crowd-Out of Private Health Insurance**

There is an extensive literature on the extent to which public health insurance coverage through Medicaid induces less private health insurance coverage. However, little is known about the effect of other components of the health care safety net in crowding out private coverage. We examine the effect of Medicaid and uncompensated care provided by clinics and hospitals on insurance coverage. We construct a long panel of metropolitan area and state-level data on hospital uncompensated care and free and reduced price care offered by Federally Qualified Health Centers. We match this information to individual level data on coverage from the Current Population Survey for two distinct groups: children aged 14 and under and single, childless adults aged 18 to 64. Our results provide mixed evidence on the extent of crowd-out. Hospital uncompensated care does not appear to crowd-out health insurance coverage and health center uncompensated care appears to crowd-out private coverage for adults and, in some specifications, children.

**WP 11979**

**James Choi, David Laibson, Brigitte Madrian**  
**Reducing the Complexity Costs of 401(k) Participation Through Quick Enrollment(TM)**

The complexity of the retirement savings decision may overwhelm employees, encouraging procrastination and reducing 401(k) enrollment rates. We study a low-cost manipulation designed to simplify the 401(k) enrollment process. Employees are given the option to make a Quick Enrollment(TM) election to enroll in their 401(k) plan at a pre-selected contribution rate and asset allocation. By decoupling the participation decision from the savings rate and asset allocation decisions, the Quick Enrollment(TM)

mechanism simplifies the savings plan decision process. We find that at one company, Quick Enrollment(TM) tripled 401(k) participation rates among new employees three months after hire. When Quick Enrollment(TM) was offered to previously hired non-participating employees at two firms, participation increased by 10 to 20 percentage points among those employees affected.

#### WP 11980

**Brigitte Madrian**

#### **The U.S. Health Care System and Labor Markets**

This paper provides a broad and general overview of the relationship between the U.S. health care system and the labor market. The paper first describes some of the salient features of and facts about the system of health insurance coverage in the U.S., particularly the role of employers. It then summarizes the empirical evidence on how health insurance impacts labor market outcomes such as wages, labor supply (including retirement, female labor supply, part-time vs. full-time work, and formal vs. informal sector work), labor demand (including hours worked and the composition of employment across full-time, part-time and temporary workers), and job turnover. It then discusses the implications of having a fragmented system of health insurance delivery—in which employers play a central role—on the health care system and health care outcomes.

#### WP 11990

**Donald S. Kenkel, Dean R. Lillard, Alan D. Mathios**

#### **The Roles of High School Completion and GED Receipt in Smoking and Obesity**

We analyze data from the National Longitudinal Survey of Youth 1979 to explore the relationships between high school completion and the two leading preventable causes of death—smoking and obesity. We focus on three issues that

have received a great deal of attention in research on the pecuniary returns to schooling. First, we investigate whether GED recipients differ from other high school graduates in their smoking and obesity behaviors. Second, we explore the extent to which the relationships between schooling and these health-related behaviors are sensitive to controlling for family background measures and cognitive ability. Third, we estimate instrumental variables (IV) models of the impact of schooling on smoking and obesity. Although our IV estimates are imprecise, both the OLS and IV results tend to suggest that the returns to high school completion include a reduction in smoking. We find little evidence that high school completion is associated with a lower probability of being overweight or obese for either men or women. The results also suggest that the health returns to GED receipt are much smaller than the returns to high school completion.

#### WP 11998.

**Phil Oreopoulos, Mark Stabile, Randy Walld, Leslie Roos**

#### **Short, Medium, and Long Term Consequences of Poor Infant Health**

An Analysis using Siblings and Twins We use administrative data on a sample of births between 1978 and 1985 to investigate the short, medium and long-term consequences of poor infant health. Our findings offer several advances to the existing literature on the effects of early infant health on subsequent health, education, and labor force attachment. First, we use a large sample of both siblings and twins, second we use a variety of measures of infant health, and finally we track children through their schooling years and into the labor force. Our findings suggest that poor infant health is a strong predictor of educational and labor force outcomes. In particular, infant health is found to predict both high school completion and social assistance (welfare)

take-up and length.

#### WP 12016

**Tomas J. Philipson, Anupam B. Jena**  
**Surplus Appropriation from R&D and Health Care Technology Assessment Procedures**

Given the rapid growth in health care spending that is often attributed to technological change, many private and public institutions are grappling with how to best assess and adopt new health care technologies. The leading technology adoption criteria proposed in theory and used in practice involve so called “cost-effectiveness” measures. However, little is known about the dynamic efficiency implications of such criteria, in particular how they influence the R&D investments that make technologies available in the first place. We argue that such criteria implicitly concern maximizing consumer surplus, which many times is consistent with maximizing static efficiency after an innovation has been developed. Dynamic efficiency, however, concerns aligning the social costs and benefits of R&D and is therefore determined by how much of the social surplus from the new technology is appropriated as producer surplus. We analyze the relationship between cost-effectiveness measures and the degree of surplus appropriation by innovators driving dynamic efficiency. We illustrate how to estimate the two for the new HIV/AIDS therapies that entered the market after the late 1980’s and find that only 5% of the social surplus is appropriated by innovators. We show how this finding can be generalized to other existing cost-effectiveness estimates by deriving how those estimates identify innovator appropriation for a set of studies of over 200 drugs. We find that these studies implicitly support a low degree of appropriation as well. Despite the high annual cost of drugs to patients, very low shares of social surplus may go to innovators, which may imply that cost-effectiveness is too high in a dynamic efficiency sense.

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