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## Program Report

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### Health Care

Alan M. Garber\*

Managed care has brought with it numerous changes in health care delivery and financing. These changes, and the shifts in incentives that they create, can have important effects on the structure of markets for health care delivery and ultimately for the types of health care delivered, its costs, and outcomes. Most analyses of managed care compare HMOs and other managed care plans to non-managed care plans. But as managed care becomes more prevalent, its impact on the structure and functioning of the health care system as a whole may become more important than differences across plans.

In a body of work, Laurence C. Baker thus asks how managed care can bring about widespread effects on health care markets and health care delivery. In two papers on health care spending,<sup>1</sup> Baker finds that areas with high levels of HMO market share spent less on fee-for-service Medicare beneficiaries. Since prices for Medicare-covered services largely are fixed by regulation under Medicare's Prospective Payment System and physician fee schedule, the lower expenditures probably reflect reductions in the intensity of services that Medicare patients receive in areas with heavy penetration of managed care. Furthermore, because the patients studied were covered by the traditional fee-for-service Medicare program, the fact that their care appears to be influenced by the presence of managed care plans suggests that the managed care system can have important effects on the performance of the entire health care system.

Changes in health care spending lead to questions about the mechanisms by which managed care may affect expenditures on and outcomes of care. In more recent work, Baker and Martin L. Brown of the National Cancer Insti-

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tute report<sup>2</sup> that areas with high HMO market shares saw consolidation in mammography facilities through the early 1990s. In other words, higher market share areas had fewer mammography providers, each doing higher volumes. Because there are significant economies of scale in providing mammography, consolidation is associated with reductions in the cost and often the price of mammograms. But consolidation also could harm patients if it made it more difficult to obtain the procedure. To determine whether this occurred, Baker and Brown study cancer diagnoses and mortality rates. Although they find that waiting times for appointments were sometimes longer in markets with greater consolidation, they also find no evidence that cancers were diagnosed at later (and more severe) stages, or that mortality rates were higher, in such markets.

Two other recent studies by Baker explore the impact of managed care on the adoption of new technologies and the related implications for costs and health outcomes. Baker and Ciaran S. Phibbs study the relationship between HMO market share and the adoption of neonatal intensive care units (NICUs). They report that areas with high levels of HMO activity saw slower adoption of NICUs than other areas between 1980 and 1996.<sup>3</sup> There are different kinds of NICUs, though, and HMOs appear to have little effect on the adoption of high-level NICUs, which offer the most advanced services for the sickest newborns and tend to be located in advanced teaching hospitals. The strongest effect of HMOs appears to be on the adoption of mid-level NICUs, which provide less sophisticated services and frequently are located in smaller hospitals that may be influenced by managed care activity.

Reductions in NICU adoption also may have produced cost savings. Moreover, Baker and Phibbs report

that reductions in mid-level NICU availability seem to have improved outcomes because they were associated with increases in the probability that high-risk newborns would receive care in high-level NICUs, where outcomes are better. Interestingly, this runs counter to the typical assumption that managed-care induced reductions in technology availability are uniformly bad for patients.

Baker has also examined the relationship between HMO market share and the adoption of magnetic resonance imaging (MRI) equipment during the 1980s and 1990s.<sup>4</sup> His results suggest that high managed care areas experience substantially slower adoption and diminished MRI availability as compared to low managed care areas. Reductions in adoption accompany reductions in MRI utilization, leaving open questions about the impact of such reductions on patient welfare, which hinge on the value of the less-frequently used MRI procedures in high managed care areas.

Baker's work builds the case that changes in financial incentives and other impacts of managed care can have important effects on the structure and functioning of the health care system. While each of his studies looks at different services, they all tend to support the conclusion that managed care has led markets toward reductions in spending. None of the studies show worse health outcomes (although, of course, they only include evidence for a small number of the many health care services that could be influenced). If managed care can influence how the health care delivery system is organized, then regulatory policy toward it could benefit from a consideration of the structural effects of managed care as well as of the care delivered by such plans *per se*.

One of the ways that HMOs are believed to lower premium costs is

by restricting access to expensive medical treatments. But according to Daniel Altman, David M. Cutler, and Richard J. Zeckhauser,<sup>5</sup> HMOs do not save money that way. After analyzing data on 200,000 Massachusetts state and local employees and family members who are insured in a single pool, they find that cost differences arise because HMOs have a lower incidence of diseases among their generally healthier members and the HMOs pay lower prices for the same medical treatments, but not because HMO members receive fewer expensive treatments.

In other research Martin N. Baily and I, reporting on a project carried out as part of the McKinsey Global Institute, examine the productivity of health care in the treatment of four conditions in the United States, Germany and England: diabetes, gallstones, lung cancer, and breast cancer.<sup>6</sup> This project looks at inputs used and types of health care delivered, along with overall resource utilization and health outcomes. We report that the United States generally uses higher levels of inputs than England and, with the exception of the management of diabetes, achieves better health outcomes. Germany uses high levels of resources for the various conditions but does not achieve better health outcomes. Much of the apparent increased health care costs for the management of these conditions in the United States could be attributed to higher prices for inputs, rather than the use of higher levels of each input.

Charles E. Phelps and I try to resolve controversies in the application of cost-effectiveness analysis by exploring the welfare theoretic foundations of the technique, which is used widely in studies of medical care technologies.<sup>7</sup> We use a standard von Neumann-Morgenstern utility framework to show how a cost-effectiveness criterion can be derived to guide resource allocation

decisions, and how the criterion varies with age, gender, income level, and risk aversion. Although cost-effectiveness analysis can be a useful and powerful tool for resource allocation decisions, we report that a uniform cost-effectiveness criterion applied to a heterogeneous population is unlikely to yield pareto-optimal resource allocations.

In a series of projects, Thomas E. MaCurdy, Mark A. McClellan, and I explore the costs and outcomes of medical care among specific groups of Medicare beneficiaries.<sup>8</sup> We find that the introduction of hospice care and other services targeted toward end-of-life care did little to slow the rate of increase in Medicare expenditures for the care of dying beneficiaries. Further, the use of such forms of care depended heavily on the principal disease the beneficiary had in the year preceding death.<sup>9</sup> Finally, Medicare patients who generated large Medicare expenditures in one year were also likely to generate excess expenditures in subsequent years, although this effect was attenuated by the high mortality rates among high-cost beneficiaries.<sup>10</sup>

Martin S. Gaynor continues to explore his long-standing interest in incentives in health care organizations and has initiated a program of research on competition and antitrust policy in health care markets. William E. Encinosa, Gaynor, and James B. Rebitzer<sup>11</sup> examine the role of social interactions in determining compensation incentives, using data from medical group practices. They find that social interactions matter, along with conventional economic considerations such as risk spreading and multitasking. In a more recent paper,<sup>12</sup> Gaynor, Rebitzer, and Lowell J. Taylor use detailed data from a large HMO to examine the impact of physician compensation incentives used by HMOs. This particular HMO compensated physicians using incentives

based on a group target for enrollees' costs; one year, incentives for quality were also introduced. The results of this study are striking: physicians respond strongly to the HMO's financial incentives by reducing costs. Larger groups are less responsive to incentives, though. Moreover, in the year that quality incentives were introduced, no apparent tradeoff between costs and quality occurred. Groups that had lower costs also had higher quality. However, the measures of quality used in this study were limited, so other aspects of quality that were not rewarded may have been neglected or compromised. Nonetheless, this paper provides some intriguing initial evidence for the intense policy debate about the possibility of managed care incentives for physicians compromising the patients' quality of care.

In another body of work, Gaynor examines competition in health care markets and the implications for antitrust policy. He and Deborah Haas-Wilson have published a series of reviews on the dramatic consolidation that has occurred in health care markets generally,<sup>13</sup> and on vertical relations<sup>14</sup> and physician networks<sup>15</sup> specifically. They conclude that although consolidation generates some potential efficiency gains, it may also seriously threaten competition. In their analysis, Gaynor and William B. Vogt propose a different method for analyzing competitive conduct in hospital markets.<sup>16</sup> They focus on testing differences in competitive conduct between not-for-profit and for-profit hospitals. The issue of the competitive conduct of not-for-profit hospitals has arisen as such hospitals have defended themselves successfully in some prominent recent antitrust cases by claiming that their not-for-profit status implies they will not exercise market power. Gaynor and Vogt specifically analyze competition

between California hospitals<sup>17</sup> and find preliminarily that not-for-profit hospitals do exercise market power, although their deviation from competitive pricing is less than that of similar for-profits. They also find that the demand facing individual hospitals is quite responsive to price and to travel time. These results, if they are sustained by the final analysis, have strong implications for hospital antitrust policy. In particular, rather than presuming that not-for-profit hospitals will not exercise market power, the presumption should be that they will do so, thus shifting the burden of proof in these cases.

Jean Abraham, Gaynor, and Vogt also have examined competition in hospital markets by considering how the numbers of hospitals in isolated local markets vary with the population of those markets.<sup>18</sup> Since entry will occur only if it is profitable, and since competition erodes profit margins, an increase in the local population per hospital should be required to obtain the profits necessary to sustain entry in more competitive markets. Abraham and colleagues find exactly that. Competition increases with the number of hospitals in the market, although none of the markets they examine is perfectly competitive.

Abraham, Ashish Arora, Gaynor, and Douglas R. Wholey examine the factors determining HMO participation and enrollment in the Medicare market.<sup>19</sup> They find that HMO participation is affected by the Medicare payment rate, the HMO's volume of commercial enrollees, and the price of Medigap policies in the area. The implications are that while increased HMO participation in Medicare can be obtained via increasing payments, such a policy is inefficient. In particular, increasing payments across the board would result in excessive payments for some HMOs and too little for others. A targeted subsidy designed to cover the sunk costs of entry would be a more efficient

method of inducing participation by HMOs. These findings are especially relevant because many HMOs have exited the Medicare program in recent years.

In a more theoretical paper,<sup>20</sup> Gaynor, Haas-Wilson, and Vogt examine the optimality of competition in health care markets in the presence of the distortion caused by moral hazard from health insurance. Since moral hazard leads to excess consumption, it has been thought that monopoly in health care markets actually could improve matters by increasing price and thus reducing consumption. Gaynor, Haas-Wilson, and Vogt show that under some standard assumptions this cannot be true. Specifically, if health care prices are lower, then an insurance policy can be offered to consumers which leaves their out-of-pocket health care expenses unchanged and has a lower premium. As a consequence, this particular distortion in health care markets does not affect the optimality of competition, as previously had been thought.

In a continuation of their work on the legal system, regulation, and health care markets, Kessler and McClellan investigate the consequences of medical malpractice liability reforms for medical treatment decisions, health care costs, and patient health outcomes. They analyze how statutory reforms to liability law affect doctors' and hospitals' incentives to administer precautionary medical treatments, and how these changes in incentives interact with the characteristics of health care markets to affect the care of elderly Medicare beneficiaries with heart disease. In one paper,<sup>21</sup> they report that malpractice reforms that directly reduce providers' liability lead to reductions in both financial and non-financial "malpractice pressures" facing physicians and hospitals. For example, "direct" reforms — such as caps on total or noneconomic dam-

ages — reduce the share of claims resolved with some compensation to plaintiffs, the share of claims with administrative and legal defense expenses, and the share of claims that take a long time to resolve. In turn, these changes in incentives lead to reductions in medical expenditures, especially expenditures on diagnostic treatments, with negligible effects on mortality and rates of cardiac complications. This implies that direct reforms improve medical productivity by reducing defensive medical practices.

In a second paper,<sup>22</sup> Kessler and McClellan investigate the extent to which liability reform affects medical productivity in those areas where HMOs are more widespread. Because the optimal level of medical malpractice liability depends on the incentives provided by the health insurance system, the rise of managed care in the 1990s may affect the relationship between liability reform and productivity. For example, more parsimonious practices associated with managed care may have reduced physicians' incentives and abilities to engage in defensive treatment, thereby reducing the productivity-enhancing effects of liability reform. The authors find that direct reforms improve medical productivity in areas with either low or high levels of managed care enrollment. In addition, managed care and direct reforms do not interact over the long run in a way that is harmful to patient health. However, at least for patients with less severe cardiac illness, managed care and direct reforms are substitutes: the improvement in productivity that can be achieved with direct reforms is therefore smaller in areas with high managed care enrollment. The authors observe that these results provide little evidence to support the expansion of liability to HMOs on the grounds that the overall level of liability is insufficient. But the consequences of a reallocation of liability

from doctors and hospitals to HMOs, if the overall level of malpractice pressure were held constant, remain unknown.

Kessler and McClellan have also explored hospital competition and its implications for the costs and quality of care. Looking at Medicare claims of elderly Americans with hospital admissions for heart attacks,<sup>23</sup> they find that before 1991, hospital competition led to higher costs and, in some cases, lower rates of adverse health outcomes. After 1990, competition led both to substantially lower costs and to significantly lower rates of adverse outcomes. As of 1991, it was approximately 8 percent more costly to be treated in the least competitive fourth of hospital markets than in the most competitive fourth. The quality of care in competitive markets was also higher. Patients in the least competitive fourth of hospital markets experienced approximately 1.5 percentage points higher mortality (that is, were more likely to die) than those in the most competitive areas.

Kessler and McClellan conclude that increasing HMO enrollment over the sample period partially explains the dramatic change in the impact of hospital competition for two reasons: First, hospital competition unambiguously improves welfare throughout their sample period in geographic areas with above-median HMO enrollment rates. Second, point estimates of the magnitude of the welfare benefits of competition are uniformly larger for patients from states with high HMO enrollment as of their admission date, as compared to patients from states with low HMO enrollment.

Kessler and McClellan suggest that spillover effects from increasingly efficient treatment of privately insured patients may have affected the treatment regimen of Medicare patients by mediating the consequences of hospital competition in a

way that enhances medical productivity. In particular, managed care appears to increase efficiency by reducing the tendency of hospital competition to result in a “medical arms race” of expenditure growth: excessive spending on medical care producing minimal benefits for patients.

Darius Lakdawalla and Tomas J. Philipson consider the forces that determine the fraction of the market that is nonprofit.<sup>24</sup> Industries in which private nonprofit production is present and significant, such as health care and education, account for more than one-fifth of U.S. economic activity. The authors argue that previous analyses of nonprofits have not separated preferences for prestige, service to the community, or size rather than profit maximization from the state-defined regulatory status of nonprofit production. They claim that this separation is crucial in predicting the underlying forces that allow the coexistence of nonprofit and for-profit production in an industry, as well as predicting such fundamental matters as the share of nonprofit activity. According to the authors, the share of nonprofit production in an industry falls with the share of the demand that is publicly subsidized, rises with the total number of firms in the industry, and rises with growth in the pace or extent of cost reductions resulting from learning-by-doing. These predictions stem from a basic aspect of regulatory nonprofit choice that links the degree of competition in a market with the share of nonprofits: the availability of economic profits under for-profit status raises the cost of choosing nonprofit status when such a status is associated with a distribution constraint. Empirical evidence based on U.S. states' panel data for the long-term care industry in 1989-94 suggests that the predictions discussed here are valid.

Philipson, William H. Dow, and

Xavier Sala-I-Martin investigate the positive complementarities between disease-specific policies introduced by competing risks of mortality.<sup>25</sup> The incentive to invest in prevention against one cause of death decreases with increases in death rates from other causes. This means that a specific public health intervention has benefits other than the direct medical reduction in mortality: it affects the incentives to fight other diseases. Thus the overall reduction in mortality in general will be larger than that predicted by the direct medical effects. The authors discuss evidence of these cross-disease effects by using data on neonatal tetanus vaccination from the Expanded Programme on Immunization of the World Health Organization.

Lakdawalla and Philipson also analyze how markets for old-age care respond to the aging of populations.<sup>26</sup> They consider how biological forces, which govern the stocks of frail and healthy persons in a population, interact with economic forces, which govern the demand for and supply of care. They argue that aging may lower the demand for market care by increasing the supply of family-provided care, which substitutes for market care. By providing healthy spouses, aging may increase the supply of family caregivers. Unexpectedly, this implies that relative growth in healthy elderly males may contract the long-term care market, while relative growth in healthy elderly females may expand that market. The authors use individual, country, and national evidence on the U.S. market for long-term care and find a negative output effect of the growth in elderly males. The novel effects of unbalanced gender growth among the elderly appear important in explaining the net decline in U.S. per capita output of nursing home care over the last 30 years, a decline that seems remarkable given the simultaneous rise in demand subsidies for long-

term care, declining fertility rates, rising female labor-force participation, and the deregulation of entry barriers to the nursing home industry.

Frank A. Sloan, V. Kerry Smith, and Don H. Taylor have been studying smoker information and risk perceptions and their relationship to smoking behavior. They are writing a book, tentatively entitled *Information, Risk Perceptions, and Smoking Behavior*, as well as several journal articles on the subject. Since smoking is a major cause of death, morbidity, and disability, the subject is of interest in its own right. But the topic also provides a window on a number of larger questions of interest to economists and others. Why do people engage or not engage in behaviors that are potentially harmful to their own health? How do people process information that affects their risk perceptions and ultimately their behavior? What is the appropriate role of government? Should the role be limited to informing people about the probabilities associated with different actions they take? Or should government seek to intervene directly into personal decisions, such as those that are highly pertinent to individuals' future health?

Individuals receive information relevant to making decisions about their health from the media, family, friends, acquaintances, clergy, health professionals, and others. They then use such information to modify prior beliefs. Sloan and his colleagues focus on people who were 50 to 64 years of age when they entered the study; at that age, people receive personalized risk messages in the form of "health shocks" that reflect past decisions about their health. The principal data for this study come from the Health and Retirement Study (HRS), focus groups consisting of current and former smokers, and a survey of current smokers in Raleigh, North Carolina. The focus groups and the survey duplicate

some of the questions from HRS, allowing the investigators to learn more about the formation of risk perception and the effects of information on the individual's expectation of living to age 75, a question asked in the HRS.

In one paper based on this research, Smith, Taylor, and Sloan use four waves of HRS, spanning the years 1992–8, to test whether longevity expectations match actual mortality at the individual level.<sup>27</sup> They conclude that subjective beliefs about longevity are consistent with individuals' survival patterns. After accounting for the selected nature of the sample of surviving respondents for each wave of the HRS, the investigators find that observed deaths are "signaled" through the lower longevity expectations of respondents in earlier interviews. Over time the evolution of subjective beliefs from those who later die displays a consistent decline. In contrast, the longevity expectations of survivors on average are higher and approximately constant over the time span observed by the panel. Longevity expectations do respond negatively to serious, new health shocks and to increases in individuals' functional limitations. Thus, an individual's longevity expectation is a fairly accurate index of a personal survival probability. However, this subjective probability does not serve as a sufficient statistic, reflecting all the private information people have about their survival prospects. In the end, though, the paper indicates that people do have well-formed views about their longevity prospects.

In another paper, the same authors use the first two waves of the HRS panel to determine how people use new information acquired through exogenous health shocks (for example, a heart attack) in revising their longevity expectations.<sup>28</sup> Measuring perceived risk as the likelihood of living to age 75 or older, current

smokers are more pessimistic than nonsmokers. Smokers also differ from nonsmokers in using new information to update their longevity expectations. Smokers are particularly sensitive to their own smoking-related illnesses and to increasing limitations in their ability to undertake physical activities (for example, walking a block, climbing stairs, lifting ten pounds, and so on). Former smokers and those who never smoked react to a much wider range of health-related signals, more specifically to diseases that are not smoking-related (for example, onset of diabetes). One implication of these findings is that generalized messages about the hazards of smoking may be less effective than information about smoking-induced activity restrictions.

Sloan has also been studying alcohol use. In a book just published, he and his coauthors investigate the relative effectiveness of alternative legal approaches for curbing excessive alcohol use and its effects, most particularly on drunk driving: administrative law, criminal law, and tort law.<sup>29</sup> Dram shop liability laws (tort laws) impose an obligation on the commercial server of alcohol to monitor service to obviously intoxicated adults and to minors. If these individuals are served and cause an accident, the server may be liable for damages. For this study, 800 owners or managers of bars and one or two of their employees were surveyed, along with police departments in the locations where the bars were located, state insurance departments, state alcoholic beverage commissions, and insurers that sell dram shop liability policies. The major result was that the threat imposed by tort law was highly effective in making commercial servers more cautious in their serving practices; tort was more effective on average than the other types of law. Imposing tort liability on commercial alcohol

servers clearly reduced motor vehicle fatalities and curbed heavy use of alcohol.

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<sup>2</sup> L. C. Baker and M. L. Brown, "Managed Care, Consolidation among Health Care Providers, and Health Care: Evidence from Mammography," *Rand Journal of Economics*, 30 (2) (Summer 1999), pp. 351–74.

<sup>3</sup> L. C. Baker and C. S. Phibbs, "Managed Care, Technology Adoption, and Health Care: The Adoption of Neonatal Intensive Care," NBER Working Paper No. 7883, September 2000.

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<sup>11</sup> W. E. Encinosa, M. S. Gaynor, and J. B. Rebitzer, "The Sociology of Groups and the Economics of Incentives: A Study of Pay Systems in Partnerships," NBER Working Paper No. 5953, March 1997. A more recent version is available at <http://www.beinz.cmu.edu/~mgaynor>.

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## Research Summaries

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### Economic Growth and Financial Liberalization

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From 1980 to 1997, Chile experienced average real GDP growth of 3.8 percent per year while the Ivory Coast had negative real growth of 2.4 percent per year. Why? Attempts to explain differences in economic growth across countries have taken center stage in the macroeconomic literature again.<sup>1</sup> Although there is no agreement on what determines economic growth, most of the literature points out evidence of conditional convergence. Poorer countries grow faster than richer countries, once it is taken into account that poor coun-

tries tend to have lower long-run per capita GDP, for example, because of the poor quality of their capital stock (both physical and human). Jeffrey Sachs and Andrew Warner<sup>2</sup> have argued that policy choices, such as respect for property rights and open international trade, are important determinants of long-run growth.

There are some interesting differences between the two countries we mentioned. First, the Ivory Coast has a larger trade sector than Chile, but the role of trade openness remains hotly debated.<sup>3</sup> Second, Chile liberalized its capital markets, in particular its equity market, to foreign investment in 1992. After the liberalization, it grew by 6.4 percent a year. The 1980s and 1990s witnessed a number of financial liberalizations. Given the recent currency crises and their adverse economic consequences, what is the role of financial liberalizations and foreign capital flows in the economic welfare of developing countries? What effect did they have on growth? Our recent work with Christian Lundblad tries to answer this question.

#### Why Would Financial Liberalization Affect Economic Growth?

There are a number of channels through which financial liberalization may affect growth. First, foreign investors, enjoying improved benefits of diversification, will drive up local equity prices permanently, thereby reducing the cost of capital. We and Peter Henry<sup>4</sup> show that the cost of capital goes down after major regulatory reforms. Writing with Robin L. Lumsdaine,<sup>5</sup> we also show that a capital inflow leads to a permanent positive effect on equity prices. Moreover, our work and Henry's<sup>6</sup> indicates that investment increases. If this additional investment is efficient, then economic growth should increase. However, in the aftermath of the recent crises, some economists feel that foreign capital has been wasted on frivolous consumption and inefficient investment, undermining the benefits of financial liberalization.

Second, there is now a large literature on how improved financial

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