

“Input and Output in Medical Care”\*

by Milton Friedman

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Some years ago, I came across a study by Dr. Max Gammon, a British physician who also researches medical care, comparing input and output in the British socialized hospital system. Taking the number of employees as his measure of input and the number of hospital beds as his measure of output, he noted that long waiting lists for hospital admission assured that all beds were in use. This meant that the total number of beds could be taken as equal to the number of occupied beds. He found that input had increased sharply, whereas output had not only failed to keep pace but had actually fallen.

He was thus led to enunciate what he called “the theory of bureaucratic displacement.” In his words, in “a bureaucratic system ... *increase in expenditure* will be matched by *fall in production*. ... Such systems will act rather like ‘black holes,’ in the economic universe, simultaneously sucking in resources, and shrinking in terms of ‘emitted’ production.”<sup>1</sup>

I have long been impressed by the operation of Gammon’s law in the U.S. school system: input, however measured, has been going up for decades, and output, whether measured by number of students, number of schools, or even more clearly, quality, has been going down.

The recent surge of concern about the rising cost of medical care, and of proposals to do something about it—most involving a further move toward the complete socialization of medicine—reminded me of Gammon’s study and led me to investigate whether his law applied to U.S. health care.

The major advances in medical care in the past half century have greatly benefited most of us. Indeed, I would not be alive today if it were not for some of them. Yet the question remains whether these gains were promoted or retarded by the extraordinary rise in the fraction of national income spent on medical care. How does output compare with input?

### Hospitals

Even a casual glance at figures on input and output in U.S. hospitals indicates that Gammon’s law has been in full operation for U.S. hospitals since the end of World War II, especially since the enactment of Medicare and Medicaid in 1965.

Before 1940 input and output both rose (input somewhat more than output presumably because of the introduction of more sophisticated and expensive treatments). The cost of hospital care per resident of the United States, adjusted for inflation, rose from 1929 to 1940 at the rate of 5 percent per year; the number of occupied beds, at 2.4 percent a year (see table 1).<sup>2</sup> Cost per patient day, adjusted for inflation, rose only modestly.

TABLE 1.  
Summary Data on Hospitals and Medical Expense, Selected Years, 1923–1989

	1923	1929	1940	1946	1965	1989
Beds per 1,000 population	6.8	7.5	9.3	10.3	8.8	4.9
Percentage of beds occupied	73.0	80.0	84.0	80.0	82.0	69.6
Cost per patient day in constant (1982) dollars		\$18	\$22	\$21	\$71	\$545
Personnel per occupied bed				0.7	1.4	4.6
Hospital expense as percentage of total medical expense		17.8	24.3	24.0	32.1	35.6
Medical cost per person per year in constant (1982) dollars						
Hospital		\$30	\$52	\$63	\$190	\$683
Other		\$143	\$164	\$200	\$403	\$1,237
TOTAL	\$136	\$173	\$216	\$263	\$593	\$1,920
Physicians						
Number per 100,000 population	130	125	133	135*	153	252†
Median income‡						
Constant (1982) dollars		\$21,722	\$23,191	\$34,407	\$82,391	\$99,016†
Ratio to per capita income		5.1	5.2	6.6	10.7	9.1†

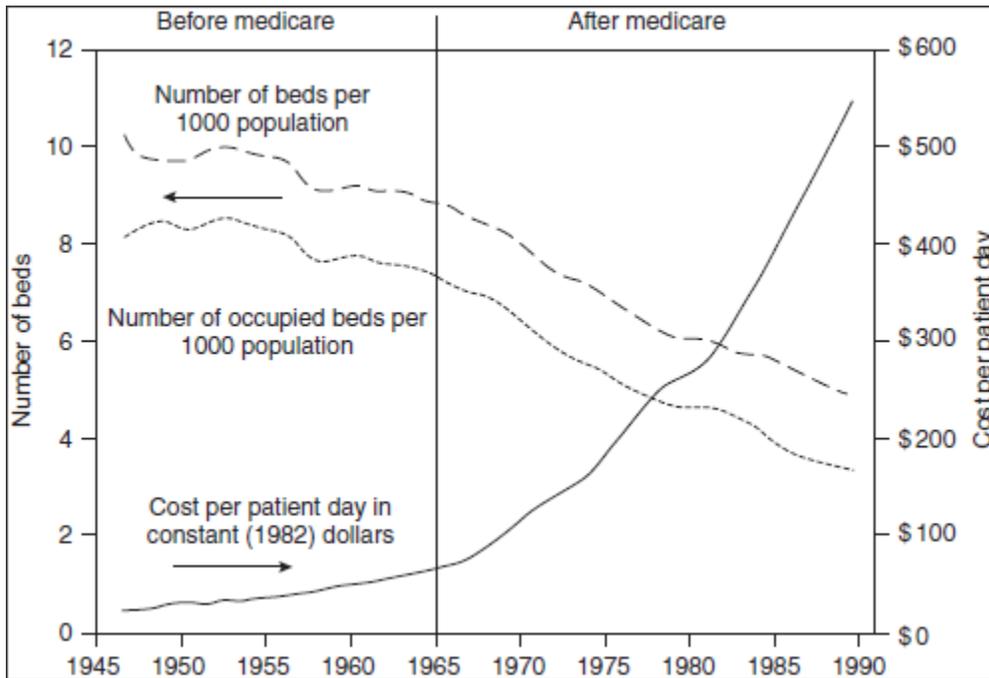
\*1949

†1987

‡“Nonsalaried physicians” through 1965; “incorporated and unincorporated” in 1987

The situation was very different after the war. From 1946 to 1989 the number of beds per one thousand population fell by more than half; the occupancy rate, by an eighth. In sharp contrast, input skyrocketed. Hospital personnel per occupied bed multiplied nearly sevenfold, and cost per patient day, adjusted for inflation, an astounding twenty-six-fold, from \$21 in 1946 to \$545 in 1989 at the 1982 price level. One major engine of these changes was the enactment of Medicare and Medicaid in 1965. A mild rise in input was turned into a meteoric rise; a mild fall in output, into a rapid decline (see figure 1).<sup>3</sup>

FIGURE 1  
U.S. Hospitals: Input versus Output, 1946–1989



Taken by itself, the decline in the number of occupied beds could be interpreted as evidence of the progress of medical science: a healthy population needs less hospitalization, and advances in science and medical technology have reduced the length of hospital stays and enabled more procedures to be performed outside the hospital.

That may well be part of the reason for the decline in output, perhaps a major part. But that does not explain much, if any, of the rise in input. True, care has become more sophisticated and expensive, and medical machines, more complex. Yet improvements in health and in the quality of hospital care do not appear to have proceeded more rapidly after 1965 than before. Indeed, there is some evidence that the reverse is true. Whereas reported expenditures on research (per capita and in constant dollars) rose at the rate of 15 percent a year from 1948 to 1964, they rose at less than 2 percent a year from 1965 to 1989. Yet the number of occupied beds per thousand population fell by 1 percent a year from 1946 to 1964 and by 2.5 percent a year from 1965 to 1989. Cost per patient day rose by 6 percent in the first period, 9 percent in the second.

Gammon's law, not medical miracles, was clearly at work. The federal government's assumption of responsibility for hospital and medical care of the elderly and the poor provided a fresh pool of money, and there was no shortage of takers. Personnel per occupied bed, which had already doubled from 1946 to 1965, more than tripled from that level after 1965. Cost per patient day, which had already more than tripled from 1946 to 1965, multiplied a further eightfold after 1965. The difference between the rise in personnel and costs reflects expenditures on expensive equipment and higher prices for medical personnel relative to other goods.

Growing costs, in turn, led to more regulation of hospitals, further increasing administrative expense. Unfortunately, I have been unable to uncover comprehensive and readily available data for a sufficiently long period to judge how large a role was played by increasing administrative costs. Anecdotal evidence suggests that increased administrative complexity played a major role in the explosion of total cost per patient day and led to a shift from hospital to outpatient care, accelerating the decline in occupied beds.

Experts in medical care and in hospital administration can doubtless expand this amateur's explanation and put flesh on the stark evidence from the limited statistical data. But a fuller description is hardly likely to alter the bottom line: in Gammon's words, "a bureaucratic system ... will act rather like 'black holes,' in the economic universe, simultaneously sucking in resources, and shrinking in terms of 'emitted' production."

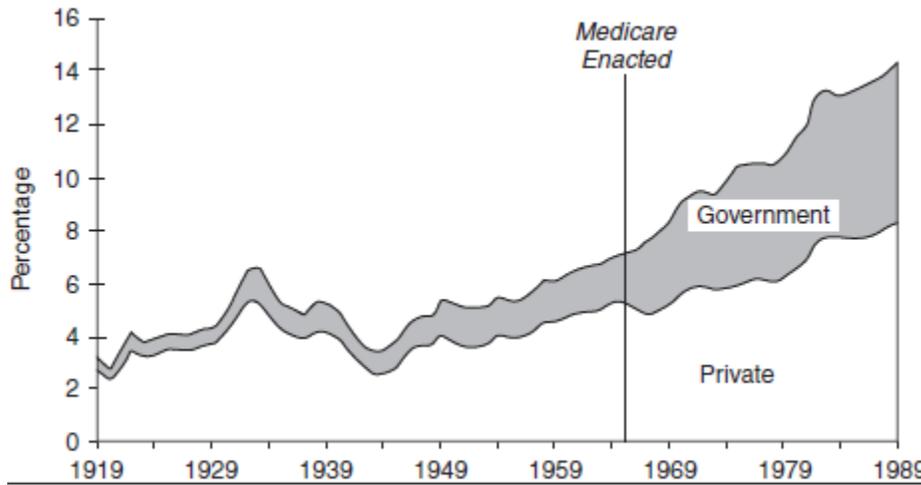
### **Other Medical Care**

Although hospital cost has risen as a percentage of total medical cost from 24 percent in 1946 to 36 percent in 1989, it is still a minor part of total medical cost. It is tempting to apply Gammon's analysis to total medical cost rather than simply to hospital care.

There is no problem about input. Estimates of expenditure on medical care are readily available for the postwar period, can be estimated back to 1919, and can be corrected readily for the rise in population and in the price level.

In figure 2, I show total health spending as a percentage of national income from 1919 on and its division between private and governmental spending. Except for the Great Depression, when the collapse of incomes raised the percentage sharply, health spending from 1919 on rose gradually but stayed between about 3 and 4 percent of total national income. Government spending was only a modest part of that total and was primarily state and local rather than federal. For example, in 1940 federal spending was about one-sixth of total government spending on health care. After the war total spending on health care tripled as a fraction of national income, and government spending, particularly federal, became an increasing fraction of the total.

FIGURE 2.  
Health Spending as Percentage of National Income, 1919–1989



In figures 3, 4, and 5, I present the same data as dollars per capita in constant prices. Private spending rose at a steady arithmetic rate up to the end of World War II, increasing by \$3.30 per capita a year, with only minor deviations as a result of cyclic forces. The increase reflected mostly the long-term increase in income. As a percentage of national income, private spending stayed between 3.5 and 5 percent from 1922 to 1958 except for some of the depression years. From 1958 on private spending began to rise as a percentage of national income—at first slowly, then more rapidly, reaching more than 8 percent by 1989.

FIGURE 3.  
Private Health Spending, 1919–1989, and Linear Trend Fitted to 1919–1940  
(Spending expressed per capita and deflated to 1982 prices.)

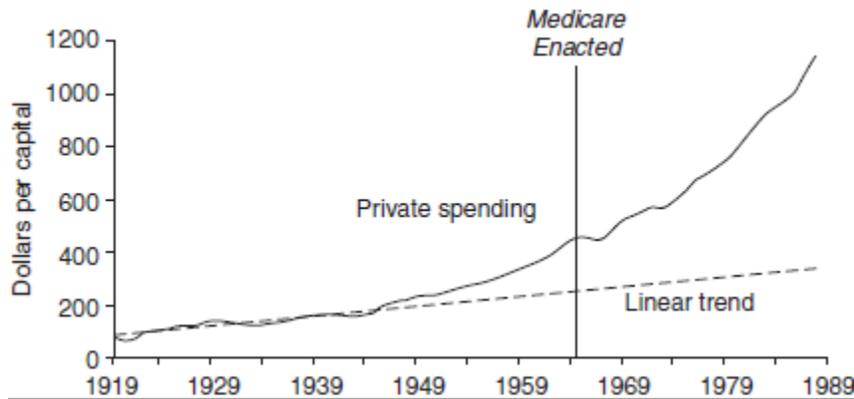


FIGURE 4.  
Government Health Spending, 1919–1989, and Log Trend Fitted to 1919–1940  
(Spending expressed per capita and deflated to 1982 prices.)

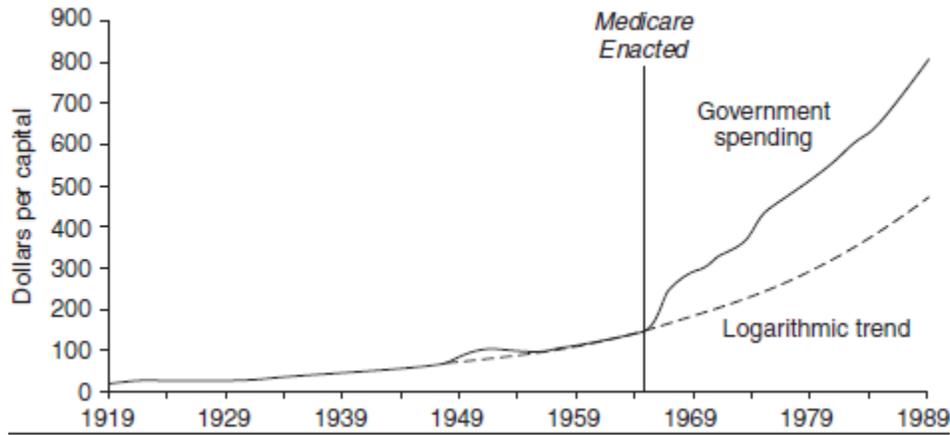
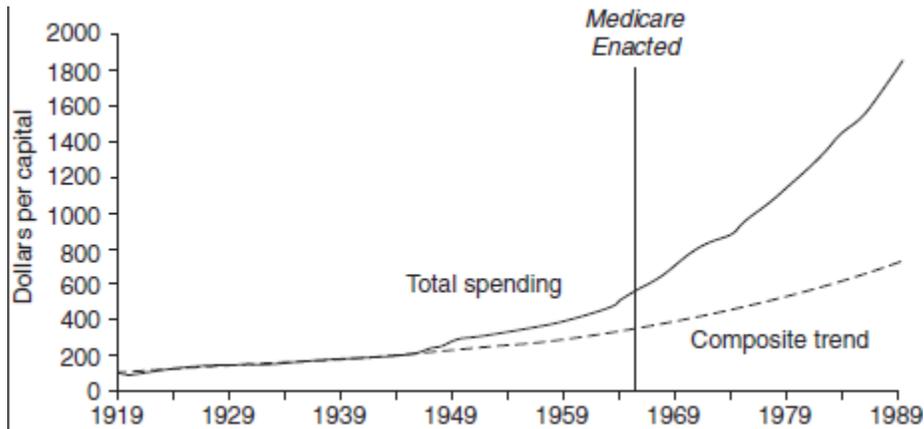


FIGURE 5.  
Total Health Spending, 1919–1989, and Composite Trend Fitted to 1919–1940  
(Spending expressed per capita and deflated to 1982 prices; composite trend is sum of linear trend for private and logarithmic trend for government.)



Government spending behaved somewhat differently, rising at a rather constant percentage rate, 3.5 percent a year, from 1919 all the way to 1965 except for a short postwar bulge. The enactment of Medicare and Medicaid produced an explosion in government spending that went sharply higher than the extrapolated trend. In the process government’s share of total spending went from 15 percent during the 1920s to 25 percent in 1965 before surging to 42 percent in the next two decades, or from less than 1 percent of national income to nearly 6 percent. The data from figures 3 and 4 are combined in figure 5 to show that, if the earlier trends had continued, total spending in 1989 would have been less than half as much as it actually was.

One major physical input is the number of physicians. Physicians numbered 157 per 100,000 population at the turn of the century, gradually declined to 125 by 1929, and then rose slowly to 133 by 1959 before beginning an exponential climb to 252 by 1987, the latest year for which I

have data. The rapid increase in the number of physicians was preceded by a sharp rise in their median income, from a level less than 7.0 times per capita income to a peak of 11.6 to 1 in 1962 (see the final line in table 1). As cost containment became more pressing, the rise in the number of physicians was accompanied by a decline in their relative income, though their income continued to rise in absolute terms. By 1987 the ratio had declined from 11.6 to 9.1, and no doubt the decline is continuing.

Despite the sharp rise in the number and income of physicians, it is worth noting, first, that the cost of physicians' services accounts for only about one-fifth of total health care cost and, second, that the share is less than it has historically been. In 1929 the cost of physicians' services was about 27 percent of total health cost; after World War II, about 25 percent. The explanation is presumably a combination of expensive equipment and administrative expense.

So much for input. What about output? That is the true problem. The output of the medical care industry that we are interested in is its contribution to better health. How can we measure better health in a reasonably objective way that is not greatly influenced by other factors? For example, if medical care enables people to live longer and healthier lives, we might expect that the fraction of persons aged sixty-five to seventy who continue to work would go up. In fact, of course, the fraction has gone down drastically—thanks to higher incomes reinforced by financial incentives from social security. With the same "if" we might expect the fraction of the population classified as disabled to go down, but that fraction has gone up, again not for reasons of health but because of government social security programs. And so I have found with one initially plausible measure after another—all of them are too contaminated by other factors to reflect the output of the medical care industry.

The least bad measure that I have been able to come up with is length of life, although that too is seriously contaminated by other factors. Improvements in diet, housing, clothing, and so on made possible by increasing affluence as well as government measures such as provision of purer water and better garbage collection and disposal have doubtless contributed to lengthening the average life span. Wars, epidemics, and natural and man-made disasters have played a part. Even more important, the quality of life is as meaningful as the length of life. Perhaps someone more knowledgeable in this field can come up with a better measure of the relevant output of the medical care industry. I have not been able to.

Figures 6 and 7 present two different sets of data on length of life: figure 6, on length of life at birth, figure 7, on remaining length of life at age sixty-five. The two tell rather different stories. For length of life at birth, data are readily available by sex and race, and I have concentrated on the length of life of females and of whites and blacks separately to keep the populations involved as homogeneous as possible over a long period. In figure 6, I show the estimated average length of life at birth of white and black females since 1900. As in the preceding charts, I have also included trends fitted to prewar data. The trends fit the data surprisingly well until the late 1950s.

FIGURE 6.

Estimated Length of Life at Birth of Females, 1900–1989, and Linear Trend Fitted to 1900–1940  
 NOTE: In computing trend, 1918 observation replaced by average of 1917 and 1919 to eliminate effect of influenza epidemic.

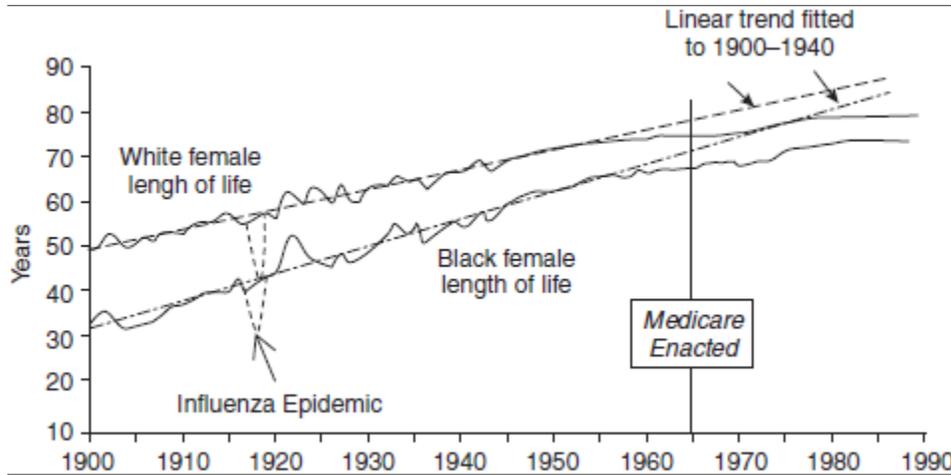
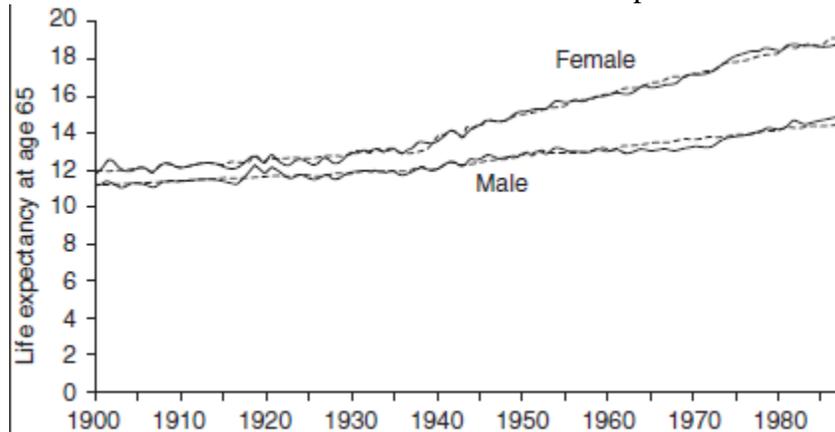


FIGURE 7.

Male and Female Life Expectancy at Age 65, 1900–1988

NOTE: Dashed lines are linear trends fitted to the two successive periods 1900–1939, 1940–1988.



Until then, life expectancy at birth of white females went up steadily, from 48.7 years in 1900 to 74.2 years in 1959, and of black females from 33.5 to 65.2 years—or, during the intervening fifty-nine years, on the average by 0.43 years per year for white females and 0.54 for black. The rise then slowed drastically. Life expectancy for white females went from 74.2 years in 1959 to 79.0 in 1989 and for black females from 65.2 years in 1959 to 75.6 in 1989—an average of only 0.16 and 0.35 years per year during those thirty years. The rate of rise was cut by more than half for whites, by more than a third for blacks.

As life expectancy lengthens, further increases are presumably more difficult to achieve—early gains would seem to be the easiest. Yet there are no signs of any slowdown for the first fifty-nine years of the twentieth century (see figure 6). The shift to a lower rate of improvement comes

suddenly, not long before the rapid expansion in the federal government's role in medical care and the sharp slowdown in the rate of increase in the amount of funds going to research.

Figure 7, on life expectancy at age sixty-five, is for both races combined because I have been unable to get data going far enough back for blacks and whites separately. In sharp contrast to figure 6, we see very slow though steady progress to about 1939 and then decidedly more rapid progress, especially for females. Does the speeding up around 1939 reflect the discovery and subsequent wider use of a range of antibiotics? I leave that as a puzzle for others.

In terms of my own concern—the effect of greater government involvement—figure 7 is of little help. For females, Medicare is followed by an initial speeding up, then tapering off; for males, the pattern is almost the reverse: little or no change from 1950 to 1970, then a speeding up. In short, it will take a far more detailed and informed analysis to reach any clear conclusions about what has been happening to the output of the medical care industry in terms of either the length of life or, even more, the quality of life.

Nonetheless, for total medical care, as for hospitals, it is hard to avoid the conclusion that Gammon's law is at work. There is no question that medicine in all its aspects has become subject to an ever more complex bureaucratic structure. No question that input has exploded. No evidence that output has come anywhere close to keeping pace, though we lack a firm basis for going beyond this very general statement. "Black holes" indeed.

Why should we be surprised? Evidence covering a much broader range of activities documents the conclusion that bureaucratic structures produce high-cost, low-quality, and inequitably distributed output. That is the dramatic lesson underlined recently by the collapse of socialism in the Soviet Union, China, and the Eastern European satellites of the Soviet Union. The U.S. medical system has become in large part a socialist enterprise. Why should we be any better at socialism than the Soviets? Or the East Germans? Or the Czechs? Or the Chinese? Medicine is not unique. Our socialized postal system, our socialized school system, our socialized system of trying to control drugs, and indeed our socialized defense industry provide clear evidence that we are no better at socialism than countries that have gone all the way.

Yet not only do we keep on being surprised, but we continue in each of these areas to *increase* the scope of socialism. Nearly all the suggestions for improving our medical system involve expanding the role of government, at the extreme moving from a partly socialist system to a completely socialist system!

### **Solution**

I believe that the inefficiency, high cost, and inequitable character of our medical system can be fundamentally remedied in only one way: by moving in the other direction, toward reprivatizing medical care. I conjecture that almost all consumers of medical services, and many producers, would favor a simple reform that would privatize most medical care. Yet that reform is not politically feasible because it would be violently opposed by the bureaucracy that plans, controls, and administers the current structure of medical care.

The reform has two major elements: (1) End both Medicare and Medicaid and replace them with a requirement that every U.S. family unit have a major medical insurance policy with a high deductible, say \$20,000 a year or 30 percent of the unit's income during the prior two years, whichever is lower. (2) End the tax exemption of employer-provided medical care; it should be regarded as a fully taxable fringe benefit to the employee—deductible for the employer but taxable to the employee. Each of these reforms needs further discussion.

(1) Preferably, the major medical insurance policy should be paid for by the individual family unit, which should receive a reduction in taxes reflecting the reduction in cost to the government. There would be an exception for lower-income families and for families unable to qualify for coverage at an affordable fee. The government would help them finance the policy though not administer it. That would be done by private competitive insurance companies chosen by each individual or family separately. Individuals or families would, of course, be free to buy supplementary insurance if they so desired.

However, even if the government were to pay for major medical insurance for everyone directly—rather than by reducing taxes—there is little doubt that both the government's cost and the total health cost would decline drastically because of the elimination of the tremendous governmental bureaucratic structure that has been built up to supervise a large fraction of all health activities.

(2) The tax exemption of employer-provided medical care has two different effects, both of which contribute to raising health costs. First, it leads the employee to rely on the employer rather than himself to finance and provide medical care. Yet the employee is likely to do a far better job of monitoring health care providers in his own interest than is the employer. Second, it leads the employee to take a larger fraction of his total remuneration in the form of health care than he would if it had the same tax status as other expenditures. If the tax exemption were removed, employees could bargain with their employers for a higher take-home pay in lieu of health care and provide for their own health care either by dealing directly with health care providers or through purchasing health insurance.

These two reforms would completely solve the problem of the currently medically uninsured, eliminate most of the bureaucratic structure, free medical practitioners from an incredible burden of paperwork and regulation, and lead many employers and employees to convert employer-provided medical care into a higher cash wage. The taxpayer would save money because total governmental costs would plummet.

The family unit would be relieved of one of its major concerns—the possibility of being impoverished by a major medical catastrophe—and most could readily finance the remaining medical costs, which I conjecture would return to something like the 5 percent of total consumer spending that it was before the federal government got into the act. Families would once again have an incentive to monitor the providers of medical care and to establish the kind of personal relations with them that once were customary. The demonstrated efficiency of private enterprise would have a chance to operate to improve the quality and lower the cost of medical care.

There is only one thing wrong with this dream. It would displace and displease the large number of people now engaged in administering, studying, and daily revising the present socialized system, including a large private-sector component that has adjusted to the system. Most of them are highly competent at what they do and would be able to use their abilities in productive activities if their current employment were terminated. But, understandably, they will not see it that way, and they are sufficiently potent politically to kill any such reform before it could ever get an extensive following, just as the educational bureaucracy has repeatedly killed even modest programs for privatizing the educational system, though poll after poll shows that the public supports privatization through parental choice.

Medical care provides a clear example of the basic difference between private and governmental enterprise. That difference is not in the quality of people who initiate or operate new ventures or in the promise of the ventures. The people proposing and undertaking government ventures are generally as able, as ingenious, and of as high moral character as the people undertaking private ventures, and the ventures they undertake may well be of equal promise. The difference is in the bottom line. If a private venture is unsuccessful, its backers must either shut it down or finance its losses out of their own pockets, so it will generally be terminated promptly. If a governmental venture is unsuccessful, its backers have a different bottom line.

Shutting it down is an admission of failure, something none of us is prepared to face if we can help it. Moreover, it is likely to mean the loss of a remunerative job for many of its backers and promoters. And they need not shut it down. Instead, in entire good faith, the backers can contend that the apparent lack of success is simply a result of not carrying the venture far enough. If they are persuasive enough, they can draw on the deep pockets of the taxpaying public, while replenishing their own, to finance a continuation and expansion of the venture. Little wonder that unsuccessful government ventures are generally expanded rather than terminated.

In my opinion, that is what is responsible for Gammon's "black holes" in medicine, schooling, the "war on drugs," agricultural subsidies, protectionism, and so on and on. That is the way high-minded motives and self-interest combine to produce what Rep. Richard Armey once labeled "the invisible foot of government." I challenge you to find more than a very exceptional counterexample.

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## Notes

\* I am indebted for helpful comments and assistance to Gary S. Becker, Robert J. Cihak, James F. Fries, Thomas Moore, and, as always, to my assistant, Gloria Valentine, who did much of the detailed work of digging out the statistical data from a wide variety of sources. This essay has been adapted from and reprinted with the permission of the *Wall Street Journal*, © 1991, Dow Jones and Company, Inc. All rights reserved.

<sup>1</sup> Max Gammon, *Health and Security*, Report on the Provision for Medical Care in Great Britain (London: St. Michael's Organization, 1976).

<sup>2</sup> Data in table 1, figures, and text are from a variety of sources, including *Historical Statistics of the United States: Colonial Times to 1970*, part 1; *Statistical Abstract of the United States*, various years; *Hospitals* (journal of the American Hospital Association), vols. 25–28, part 2 (June 1951–June 1954), and vols. 29–45, part 2 (August 1, 1955–August 1, 1971); American Hospital Association, *Hospital Statistics*, 1971–1990/91; U.S. Health Care Financing Administration, *Health Care Financing Review*, various issues from 1979 through 1990; U.S. National Center for Health Statistics, *Health, United States*, 1975–90.

<sup>3</sup> Because the scales are arithmetic, the percentage rate of decline in output is understated and the percentage rate of rise in input, overstated. However, the percentage rate of rise of input, like the absolute, did speed up after Medicare—from 6 percent per year before Medicare to 9 percent after, according to exponential trends fitted to hospital costs per patient day for 1946–1964 and 1965–1989, respectively.

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10/5/12