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Philosophical Origins of the Economic Valuation of Life

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AS GOVERNMENTAL HEALTH POLICY REQUIRES increasingly complex decisions, it produces an ever-growing need for more systematic and explicit modes of policy analysis. Cost-benefit analysis, the main form of economic reasoning applied to public policy decisions, continues, however, to be the source of often vehement disagreement among practitioners. The intensity of the debate surrounding the ascription of dollar values to life and health in such analyses suggests that more than merely technical issues in measurement and accounting practices are involved; rather, basic social values are coming into conflict.

This article seeks to illuminate the principles at stake beneath the two competing methods of valuing the benefits of public health programs for cost-benefit analyses by tracing them back to their origins and subsequent development in economic theory. Whereas the distinction between the two competing methods of accounting is usually drawn in terms of reliable numbers for one and theoretical desirability for the other, this analysis indicates that the important differences between the two methods are due to their connections with two distinct interpretations of the role of government in a democratic society.

A fundamental tension persists within welfare economics between

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the view that the proper role of government is to actively promote the well-being of its citizens and the view that government should in general refrain from interfering with individual behavior, even if this behavior is wasteful or self-destructive. The dominant tradition of economics throughout the nineteenth and into the twentieth century focused on the determinants of economic growth or the "wealth of nations." The best governmental policy was the one that most effectively furthered such growth; laissez-faire doctrines were justified by the claim that, by doing the least, government was in fact doing the most good for its citizens. Such an orientation clearly provides a role for experts and educators who can identify the most effective way to promote the public good and mold the values of the citizenry in a manner conducive to the attainment of that good. Cost-effectiveness and cost-benefit methodologies were developed by economists as ways of rationalizing government expenditures, so as to achieve the maximum desired effect for the minimum required cost.

The opposing body of doctrine, dating back to liberal political philosophy, places primary emphasis on respecting existing values and decisions on the part of society's members. Even if the behavior of its citizens does not produce the greatest possible level of material wealth or the best achievable health status, it is not for the state to use its powers of coercion to change that behavior. As this doctrine gained ascendancy in the middle of the current century, economists developed econometric methods to identify the "revealed preferences" of the citizenry so as to provide guidance for public policies. The values citizens place on economic goods are reflected in the amounts they are willing to spend on those goods, according to this doctrine, and, hence, market prices could be used as appropriate valuations for the goods financed by the government. Market prices reflect the extent of ignorance and irrationality among the populace as well as the distribution of income, since these influence consumer demands for goods and services. A key operational principle underlying the revealed preference doctrine is that the appropriate molding of values and distribution of income are issues outside the professional competence of the economist.

This article argues that the basic tension within economics is reflected in the continuing debate between proponents of the two different methods for ascribing dollar values to life and health for public programs.

The "human capital" approach is based on a view of the government as an active agent in society, seeking ways to direct health resources towards their most efficient uses and to educate the citizenry as to the implications of behavior on health status. The "willingness-to-pay" approach, on the other hand, is based on the ascription to government of a more passive role. Emphasis is placed on respecting the allocation of resources produced by a market economy and on not directly intervening in the formation of individual values, attitudes, and behavior patterns relevant to health. For this reason, the conflicts between the two methods are not resolvable merely through the development of new and more intricate systems for collecting numbers.

The historical analysis has two important implications for the application of economic reasoning to health programs. First, the somewhat defensive tone taken by some practitioners of the human capital approach (Klarman 1982; Hodgson and Meiners 1982; Scitovsky 1982) and the self-righteous tone adopted by some proponents of the willingness-to-pay approach are unwarranted. The human capital approach not only provides a reliable and internally consistent set of numbers, but has a strong theoretical foundation, and as such can provide useful information to decision makers in the public sector. Second, the willingness-to-pay approach is no less value-laden than the human capital approach, and both reflect judgments concerning the appropriate distributions of income and health status in society. Indeed, for all the emphasis traditionally placed by economists on the differences between the human capital and willingness-to-pay approaches, the two methods are quite similar in accepting as given the existing distributions of income and wealth. This constrasts sharply with much contemporary work in social philosophy, such as that of Rawls (1971), in which distributional issues take precedence over economic efficiency. Seen from this larger perspective, both methodologies lie within the utilitarian tradition, which has dominated economics and much of social theory for two centuries.

While both the human capital and willingness-to-pay methods can serve to aid public decision making, neither should be allowed to determine it. The principles of a democratic society insist that such decisions be made ultimately through the political process. As such they will inevitably reflect distributional concerns in addition to those relating to the aggregate economic impact of public expenditures.

This may, in turn, generate a new set of tasks for economic methods, such as the calculation of the costs and benefits accruing to different groups from the same proposed governmental program.

Alternative Accounting Principles for the Valuation of Life

Through the early 1970s the dominant approach to estimating the value of a human life was the human capital method. Expected future earnings are employed on the assumption that they reflect the individual's potential contribution to the economy, or, more precisely, that a worker's wage equals the value of his or her marginal product. Although its basic principles have been used at least since the seventeenth century (Petty 1699), the human capital method was brought to the health care field by Mushkin (1962), and has been developed to its current status by Rice and Cooper (1967), Brody (1975), and Cooper and Rice (1976). It is the method suggested by the U.S. Public Health Service for studies done under its authority (Hodgson and Meiners 1979, 1982).

Using life expectancy tables by sex and race published by the National Center for Health Statistics, labor force participation rates by sex, race, and education level published by the Bureau of Labor Statistics, and mean earnings tables by age, race, sex, and educational level, also published by the Bureau of Labor Statistics, the human capital method estimates how long the average member of each demographic group would continue working if unimpeded by illness, and at what wages. Housewives are accorded the expected earnings of service workers such as maids and cooks. The future income stream is discounted at a rate that is taken to approximate the social rate of time preference. Usually several discount rates are used for comparison purposes.

In the year 1972, for example, Cooper and Brody (1976), using a 2 percent annual discount rate, estimated the value of a college educated white man between the ages of 25 and 29 as $475,000. A white man who dropped out of high school had a value of only $248,000, while another, also a high school dropout and nearing retirement at age 62, would be worth $41,000. A black male high school dropout

aged 25 to 29 was worth $165,000. The figures for white and black women of the same age and education level were $140,000 and $108,000, respectively.

Discounted future earnings are not considered by proponents of the human capital method to be a complete measure of the benefits of health programs. The expenditures on medical care that would have been incurred by the prevented accident or illness are also calculated. It is acknowledged that not easily quantifiable benefits such as pain and suffering are important. As such, the quantifiable human capital measures are put forth as a lower bound on the true benefit to health programs. Any program that passes the cost-benefit test using this measure of benefits would, in principle, pass a test using a more complete measure.

The human capital approach has been criticized by many academic economists on the grounds that it is not consistent with the body of neoclassical welfare economics, which focuses on consumer behavior in purchasing goods and services, including expenditures on lifesaving programs. In this view, the human capital method measures a meaningless entity, and should be discarded in favor of the willingness-to-pay method.

The intuitive rationale underlying the willingness-to-pay approach is that each person considers the value of his or her own life to be infinite, but does not feel similarly about small statistical changes in risk. If the cost of a health program or regulation exceeds its benefits, as measured by the beneficiaries, then the program or regulation is not economically efficient and should not be adopted. The willingness-to-pay approach focuses on the subjective evaluation by the beneficiaries, rather than on any objective measure such as lives saved or years of disability reduced.

While the human capital approach clearly favors programs and regulations benefiting the middle-aged, the white, and the educated, the willingness-to-pay approach seeks to avoid the issue of distribution of income through an appeal to the doctrine of the potential Pareto improvement. A Pareto improvement is a change in the affairs of the world that makes no individual worse off and at least one individual better off. A Pareto optimum is a state of affairs where no Pareto improvements are possible, and economists posit Pareto optimality as a necessary, although not sufficient, condition for any organization of society to be deemed in some sense "good."

The problem is that Pareto optimality by itself provides a very weak basis on which to evaluate public policy, and is biased toward maintenance of the status quo. Very few governmental programs entail no disadvantage to anyone, and, thus, strict adherence to the Pareto principle would create a very passive public policy. Kaldor (1939) and Hicks (1939) developed the concept of what has come to be known as the potential Pareto improvement to deal with this quandary. They note, first, that if the benefits in money to those who gain from a governmental program exceed the costs to those who lose, then the winners could make compensatory side payments to the losers, and still have benefits left over. If these side payments were made, then the program would be a Pareto improvement. In most cases, however, such side payments are not made. The potential Pareto improvement doctrine maintains that the government should undertake all projects where the sum of the benefits to the winners exceeds the sum of the costs to the losers, whether or not the losers are actually compensated.

Three alternative procedures have evolved for measuring how much individuals would be willing to pay to reduce the risk of their own death or illness. Direct questioning through the use of surveys of small groups of people has been pursued by Acton (1976) and Jones-Lee (1976), following Schelling (1968). Safety-related "consumption" behavior has been studied in the case of seat-belts by Blomquist (1979), highway speed by Ghosh, Lees, and Seal (1975), and residential smoke-detectors by Dardis (1980). By far the most popular, however, have been studies of compensating wage differentials obtained by workers in hazardous jobs, including those by Thaler and Rosen (1975), Viscusi (1979), and Olson (1981).

The statistical strategies used in these studies vary and have elicited considerable discussion and mutual criticism among the economists involved. The numbers themselves have ranged from the implausibly low to the implausibly high (Landefeld and Seskin 1982), and there exist willingness-to-pay figures capable of justifying or rejecting almost any proposed program. Nevertheless, there is widespread agreement among economists that, for all its statistical problems, the willingness-to-pay approach is theoretically sound. Mishan (1971), in what is probably the most frequently cited article in this literature, sums up the argument:

> In view of the existing quantomania, one may be forgiven for asserting that there is more to be said for rough estimates of the

precise concept than precise estimates of economically irrelevant concepts.

The remainder of this article will argue that the standard characterization of the willingness-to-pay approach as desirable on theoretical grounds, though limited by practical problems, is incorrect. Any conceptual strength possessed by the willingness-to-pay approach stems solely from its compatibility with the subjectivist orientation of the welfare economics of the postwar period. Analysis of the philosophical origins of that school of economics reveals that the path it took is not the only one possible, and that for some purposes others may be better. The next section will consider the philosophical origins of the human capital approach; the subsequent one turns to the willingness-to-pay approach.

The Human Capital Approach in Perspective

Measuring the Returns to Investments in Health

In order to appreciate the human capital approach to valuing human life, one must see it in the context from which it arose. The substantial development of the method occurred in the early 1960s, at the time when interest among economists was turning to "human resources" as a neglected and undersupported component of the nation's economy (Denison 1962). The main work using the human capital approach to evaluate the potential for economic growth was Mushkin's 1962 article, "Health as an Investment." Mushkin notes the political motivation beneath the effort to translate the loss of human life and health into economic terms, namely, in order to persuade policy makers to increase funding levels for health and education. The widespread interest in the contribution of health care and education to economic growth comes from "people anxious to add weight to their demands for action against disease and illiteracy by showing that such action is not only humanitarian, but will make a major contribution to economic growth as well."

Economic growth as measured by the gross national product (GNP) is not a final goal, however, but rather a means to the goal of increasing human happiness and creativity. Mushkin quotes approvingly from a proposal in which society "would use its economic power increasingly for the extension of freedom, of knowledge, and of understanding

imagination rather than a rapid multiplication of wants." Increased investments in health and education were to be a means of access to those higher goals.

These quotations recall the principal arguments of Galbraith's 1958 book, *The Affluent Society*. Galbraith begins by emphasizing the role played by commercial advertising in forming peoples' desires for relatively superfluous consumer goods. The goods that Galbraith felt could add most to society's well-being were public goods, such as education and health care, which were produced largely outside the profit-making and hence advertising-oriented sphere of the economy. What is important for our purposes is the underlying distinction between what people may want at any particular time, and what will really make them happy. Galbraith argues that individual consumer demands, as expressed in market prices, should not be taken uncritically as guides for decisions concerning the size and allocation of governmental budgets.

The Material Welfare School

The interest among economists developing the human capital methodology in returns to education and health care, and the skepticism with regard to market prices and revealed preferences, contain an echo of the writings of the material welfare school, dominant in English economics between 1880 and 1940 and associated with such names as Marshall and Pigou. The central concept of utility and the understanding of the role of economic theory held by these authors came under severe criticism, beginning with Robbins (1932), from economists employing a subjective interpretation of utility and a more-restricted view of the proper role for economic science. These latter views eventually became the dominant stream of economic theory on both sides of the Atlantic. Since the willingness-to-pay approach to estimating the value of life is based explicitly on this new view of utility and understanding of economics, it is worthwhile reconsidering some of the key propositions of the material welfare school to see if they are as obsolete as much of modern welfare economics assumes.

In reading Marshall (1890) and Pigou (1920) one discovers the concern with economic growth and the returns to different forms of investment familiar to economists promoting the human capital approach. Pigou finds an underinvestment in what we would call human resources and predicts high returns to any transfer of society's funds in that direction. The most important areas of potential investment in his view would be industrial training, medicine and special nutrition for

the sick, and education (Pigou 1920, 747–50). The unequal marginal returns to alternative investments result from the unequal distribution of income, in Pigou's view, since the children of the poor have few chances of developing their skills and hence contributing fully to society.

This analysis, similar to Progressive era thinking in the United States (Starr 1982) and in some respects to the growth theorists and Galbraith, is based on an explicit theory of the nature of utility. Pigou addresses the question of why the quantity of economic goods, as measured by conventional national income accounting, should be of paramount concern to economists, since human happiness and not the absolute level of consumption is the ultimate and proper goal of concern.

Pigou is careful to emphasize that economic well-being is not an end in itself but a means to greater and more intellectual ends. In particular, gross poverty prevents people from realizing their human potential. In this he directly follows the perspective of Marshall, who begins his major work with a section on "the urgency of the problem of poverty":

> Overworked and undertaught, weary and careworn, without quiet and without leisure, [the poor] have no chance of making the best of their mental faculties (Marshall 1890, 3).

This led naturally to a preoccupation with the objective conditions necessary for the attainment of an adequate way of life. The focus of economic theory was therefore to be placed, as it had been since Adam Smith, on the causes of changes in a nation's income. While society might concern itself with many nonmaterial pursuits, the proper concern of the economist was with those essential items necessary for all people to live decently. Marshall proposed a hierarchy of needs, beginning with food, and proceeding through clothing, shelter, and heat to rest and "hopefulness, freedom, and change" (Marshall 1890, 195–97). Utility was interpreted in a largely physical sense, the satisfaction of true needs common to all human beings.

The most controversial doctrine of the material welfare school, the comparability of satisfactions between individuals, flowed from this physical interpretation of utility. Although one could not compare the utility gained by any two particular individuals from the consumption of any particular good, people were sufficiently similar that general

comparisons between average individuals or groups of individuals were possible. The most important application of this doctrine concerned the distribution of income. Since human wants were of differing levels of importance, and since people could, in principle, be counted on to satisfy their most important needs first, a transfer of income from rich to poor would lead to a satisfying of more essential needs. Income redistribution would thereby increase the total sum of social well-being, assuming that such a redistribution did not significantly reduce the total wealth of society, such as through adverse effects on work incentives. (For a more extensive discussion of this point, see Cooter and Rappoport [1984].)

An obvious problem was that people did not always desire what was good for them. In chapter 2 Pigou makes the crucial distinction between what he calls the satisfaction a person gets from consuming a good, which resulted from alleviating an objective, physical need, and the utility which resulted from the sating of a psychological desire. Market prices measure only people's psychological desires for goods, not the true satisfaction of needs that may ensue (Pigou 1920, 23). From this vantage point market prices cannot be accepted uncritically by the economist, and the consumer's wishes are not considered sovereign unless they also accord with his or her true needs.

This perspective could pose quite a quandary to economists concerned with concrete proposals for improving welfare rather than abstract distinctions between use value and exchange value were it not the case, in Pigou's eyes, that the two coincided in most cases (Pigou 1920, 24). But the important point remains that consumer preferences, as revealed through the market, cannot be taken as absolute givens by economists. People are well known to spend their money occasionally on commodities that are either useless or positively harmful to their true well-being. Moreover, the given structure of prices and quantities reflects the existing distribution of income, which is far from optimal according to Pigou's criteria, and a more equitable distribution will produce a different configuration of revealed preferences (Pigou 1920, 87).

Material Welfare and the Human Capital Approach

The similarities between the underlying assumptions of the human capital method and some of the central propositions of the material welfare school are striking. The proponents of the human capital

method might not wish to claim the lineage, given the current state of dereliction in which the material welfare school finds itself. It could be argued, however, that if the human capital method is to develop any theoretical basis, it will have to seek it in the tradition of Marshall and Pigou.

As noted earlier, the human capital method obtained its original impetus from the assumption that institutional arrangements in the capitalist economic system lead to an underinvestment in human resources and thus to unequal rates of return in different sectors. This proposition is found explicitly in Pigou, and has served as a keystone for Progressive era and, later, for social democratic governmental policies. This concern with rates of return is in turn based on the view, held strongly by both the material welfare school and the proponents of the human capital approach, that increases in measured gross national product, while not synonymous with increases in welfare, are in most cases necessary conditions for such increases.

The one salient divergence of the human capital approach from that of the material welfare school should be kept clearly in view, however: the proponents of the human capital approach have not adopted any of Pigou's advocacy of income redistribution. The hypothesis that market wages reflect worker productivities, upon which the human capital approach rests, assumes that productivity is a characteristic of the individual. Yet labor economics of the past two decades has emphasized that many skills are learned on the job and are specific to particular jobs. Unequal access to entry level jobs, therefore, as well as unequal access to formal education, can lead to a low valuation of particular groups in the reckoning of human capital-based governmental programs.

A Reexamination of the Willingness-to-pay Approach

The Basis in Modern Welfare Economics

We are now in a better position to analyze the claim to legitimacy of the willingness-to-pay method, namely its grounding in theoretical welfare economics. The doctrine of the potential Pareto improvement, which underlies the willingness-to-pay approach, is diametrically opposed to the orientation of the material welfare school. It denies that individuals' productivities and wages bear any relation to the amount that should

be spent to save their lives. Rather, peoples' own valuations of small changes in risk must be used, and these are to be valued at market prices. This doctrine, and the willingness-to-pay method based on it, flow directly from another, more recent, tradition in welfare economics that developed as a reaction to and criticism of the material welfare school.

The most famous attack on the positions of Marshall, Pigou, and their associates appeared in 1932 in Robbins's *Essay on the Nature and Significance of Economic Science.* In this slender volume Robbins presents a new definition of economics, a new understanding of utility, and a critique of some of the salient elements of the material welfare doctrine, including the interpersonal comparison of utilities and the skepticism vis-à-vis market prices. Many willingness-to-pay criticisms of the human capital approach turn out to be restatements of Robbins's arguments.

Robbins begins by attacking the notion that economics as a science could identify a certain sector of human behavior, such as that concerned with material needs, as its particular area of specialty. There could not, in this view, be a ranking of needs in terms of importance. Such a ranking, in Robbins's view, is an untenable vestige of the distinction between productive and unproductive labor dating back to Adam Smith and the Physiocrats. Robbins (1932, 14–15) proposes an alternative definition, the one that is now usually presented in economics textbooks, namely that economics is the study of choice among alternative and scarce means to competing ends. No valid distinction may be made between the utility value of a meal and a night at the opera. Both require scarce resources, and both provide utility to the consumer. "Thus wealth is not wealth because of its substantial qualities. It is wealth because it is scarce" (Robbins 1932, 47). Three sequelae, which will turn out to be important for the attempt to place a dollar value on human life, follow from this basic position.

The first, which has always been the most discussed aspect of Robbins's essay, is that the validity of interpersonal comparisons of utility is rejected. Robbins interprets the material welfare school's focus on redistribution as being based on the law of the diminishing marginal utility of income. Within the context of Robbins's own new definition of economics, however, this law no longer provides any justification for the comparison of the utility of a given object to different people and hence for the redistribution of income. Any

particular individual confronting the economic problem of satisfying needs with scarce means places a preference ranking on the various goods available, a ranking that is observable from his or her purchases. But the material welfare school's use of these orderings as the basis for comparing the utility obtained by different individuals from a given expenditure of money is criticized (Robbins 1932, 138).

The important point is that an additional dollar's worth of consumption value consumed by a rich person cannot be judged as producing less utility from society's aggregate point of view than the same dollar's consumption by a poor person. This plays a key role in the doctrine of the potential Pareto improvement, where a governmental program that produces benefits to the rich to the detriment of the poor of such a size that the rich would be able to compensate the poor, but in fact do not do so, may nevertheless be considered a program that increases society's total welfare. For the material welfare school, in contrast, measures that increased the wealth of society as a whole were only desirable so long as they contained no significantly regressive distributional aspects.

Second, Robbins (1932, 142) denies to economics any special ability to identify programs as increasing society's well-being and hence to be recommended. This contrasts sharply with the clear advocacy of general principles of action (though not particular legislative programs) by the material welfare school, such as the increased funding to the health care and education of the poor, and, in general, with the view of the government as an active agent in society. It also contrasts sharply with the efforts of some economists writing in the 1950s and 1960s to reorient total spending toward the public sector and investment in human resources and, with the human capital method they developed, to show that the economic returns to such investments would be greater than previously imagined.

Most important for the valuation of life, Robbins's redefinition of utility prohibits any reticence as to the accepting of consumers' preferences and the market prices that they generate as revealing what is good for those individuals. This same prohibition is applied by Hayek (1961) to Galbraith's rejection of revealed preferences in advocating a reallocation of society's investments toward public goods. It is repeated by Mishan (1971) in his rebuff to skeptics of the validity of life values revealed through willingness-to-pay studies. If some risks are not perceived as such by the public and hence have no impact on

subjective utilities, then Mishan argues that it is not for the economist to declare that the risks to life have some value that can be measured independently, by the human capital method or any other. According to Mishan, consumers' preferences and the willingness-to-pay "prices" that they generate are to be taken as the basic data upon which the welfare economist builds his or her analysis.

The centrality of the issue of market prices to the whole of cost-benefit analysis and not simply to valuations of life is evidenced by Harberger's (1971) essay pleading for unanimity within the economics profession with respect to three principles of welfare economics: the competitive-demand price measures the value of a good to the consumer, the competitive-supply price measures the value of the good to the producer, and, when evaluating the net benefits or costs of a given project, the costs and benefits accruing to each member of society should be added without regard to the individuals to whom they accrue. Distributional issues can be handled subsequently via tax policy, and should not be discussed by economists doing cost-benefit analysis.

This article in effect reiterates all the standard arguments used by the "new welfare economics": Robbins's critique of Pigou's skepticism as to the validity of market prices, his rejection of income distribution discussions as outside the professional competence of the economist, and Kaldor's division of efficiency from equity issues in the formulation of governmental policy. The felt need for such an article reveals the extent to which the subjectivist revolution, while completely victorious over the material welfare school on the theoretical level, was having a hard time winning over welfare economists to whom the issue of income distribution was a central rather than peripheral aspect of their work. It supports Fraser's (1932) analysis of Robbins's scarcity-based definition of economics as a normative prescription for what economists ought to do, rather than a positive description of what they really were doing.

The Limitations of the Willingness-to-pay Approach

The chief virtue of the willingness-to-pay approach to the valuation of life and limb, in the eyes of its proponents, is its basis in and consistency with the "new welfare economics" since Robbins. It turns out, however, that the willingness-to-pay methodology suffers from

some of the very limitations it attributes to the human capital approach. Its subjectivist orientation also propels it into a position potentially inconsistent with the basic principles of cost-effective public policy, i.e., that policies should be utilized that obtain the maximum effect for any given expenditure of funds. Finally, the willingness-to-pay approach suffers from circularity, since the subjective valuations citizens place on governmental health programs are often influenced by those programs. This section will elaborate on each of these points.

The willingness-to-pay approach is posited as a means of directly evaluating the social utility of a particular project, as measured by the beneficiaries themselves. Mishan's rejection of maximizing the gross national product (GNP) as a criterion for social policy echoes Robbins's similar criticisms of the material welfare school. In this matter, however, the willingness-to-pay approach is less different from the human capital approach than its proponents might have one believe. As discussed earlier, the willingness-to-pay approach is rooted in the doctrine of the potential Pareto improvement as the criterion for evaluating social policy. But Kaldor, in his original 1939 article proposing the potential Pareto improvement as the foundation for the new welfare economics, explicitly notes that the new maxim is equivalent to the GNP criterion, since distributional consequences could be dealt with separately. Any program that increases "aggregate real income" should be supported, according to Kaldor, because, in principle, such projects are capable, through appropriate compensation mechanisms, of making everyone better off than before the project. It is here that the two methods of valuing lives show most clearly their common roots in utilitarian social theory.

Second, the willingness-to-pay approach of asking individuals of different social classes how much they would pay to reduce risk by a given amount would produce rankings rather similar to those from the human capital approach. Schelling (1968) noted this in the essay that first proposed a willingness-to-pay orientation over the human capital approach to valuing the benefits of health programs. Rich people are willing to pay more to reduce risks in the same fashion as they are willing to pay more to avoid wasting time—simply due to their higher incomes. This indifference to distribution lies at the heart of the willingness-to-pay approach. As interpreted by Dobb (1969, 82), the potential Pareto improvement doctrine was an attempt to substitute economic growth for income distribution as the fundamental

concern of welfare economics. Commenting on the rapid adoption of Robbins's critique of Pigouvian welfare economics, Dobb writes:

> What was urgently needed by most economists, if their subject was not to disintegrate, was some way of squaring the fashionable skepticism about interpersonal comparisons with an ability to formulate propositions of the type of Pigouvian Proposition 1 (concerning the benefits of economic growth).

The parallel with the human capital method's emphasis on economic growth to the exclusion of redistribution is striking.

It is sometimes claimed that the human capital method would direct governmental funds to health programs that produced quick returns of certain types of individuals to productive labor at the cost of investment in programs for disease prevention and basic health sciences research whose returns were more distant but potentially far greater. Whatever the merits of these criticisms as directed against the human capital method, they are certainly relevant for evaluating the willingness-to-pay approach. As Weinstein, Shepard, and Pliskin (1980) point out, the willingness-to-pay approach reveals that people place different values on risk-bearing in different situations and that adherence to this preference-ranking could direct governmental expenditures into curative programs aimed at acutely ill individuals, to the detriment of potentially more effective preventive programs.

It is clear that the subjective orientation of the willingness-to-pay approach could lead to an allocation of public funds in a manner inconsistent with the principles of cost effectiveness. Those principles maintain first and foremost that governmental energies should be devoted to those areas where the potential improvements in health status and longevity are greatest. There is no reason to assume that the most cost-effective programs, where benefits are measured in terms of mortality and morbidity statistics, would, in every case, be those most appreciated by the citizenry. Indeed, it is precisely an impatience with the allocation of public funds according to the subjective preferences of the politically powerful sectors of the population, rather than according to objectively measurable standards of maximum effectiveness, that lies at the root of economists' interest in cost-benefit and cost-effectiveness analyses.

The willingness-to-pay approach is consistent with society's emphasis on individual responsibility and rejection of paternalism, and with

the prominent role played in the economics discipline by the doctrine of consumer sovereignty. There exists, however, another set of values in society, equally strongly held, that emphasizes the ability and responsibility of society and its members to improve themselves, largely through an educational process that molds values and, ultimately, choices. Society has always had as much concern to influence the values and choices of its members as it has had to respect them as they are. This alternative set of social priorities has played much less of a role in modern economic theory, especially since the turn toward a subjectivist interpretation of utility, and finds no echo in the willingness-to-pay approach to the valuation of life. Yet, the governmental health programs and regulations to which willingness-to-pay-based cost-benefit analyses would likely be applied have traditionally placed a large part of their emphasis precisely on the effort to change the attitudes and behavior of individuals in society. It is essential, therefore, to be cognizant of the role society does and should play in influencing the values that its members place on risk to life and limb, and of the caveat this places on the use of willingness-to-pay-based studies for the guidance of public policy.

It is clear that attitudes toward risk are not born with the individual but evolve throughout life on the basis of personal experiences and contact with organizations whose efforts are explicitly devoted toward influencing those attitudes. Willingness-to-pay values are influenced by governmental programs and regulations and, hence, are endogenous to the very system they are supposed to guide. Indeed, health promotion, the altering of personal behavior in manners conducive to improving health status, has become a major focus of governmental health policy. Worker and citizen attitudes toward health hazards encountered on the job and in the community are undoubtedly influenced by governmental efforts to limit dangers, and no single issue has dominated occupational and environmental health policy discussions over the past few years as much as the worker's and community's "right-to-know" about hazardous substances.

Cost-benefit Analysis in a Democratic Society

The economists' case against the human capital and in favor of the willingness-to-pay approach is usually formulated as a rejection of the relevance of maximizing the GNP as a policy objective and an affirmation

of the necessity to respect individual preferences. It is clear that neither the negative nor the positive component of the traditional argument is acceptable without reservations.

While the majority of the population in the industrialized nations no longer lives in the conditions that prompted Pigou to identify an increase in material welfare with an increase in overall welfare, it requires a studied indifference to the status of both the less-developed countries and the less-favored citizens of the developed nations to reject economic growth as a valid goal for public policy. Furthermore, the clear potential for willingness-to-pay-based valuations to deepen existing inequalities and reproduce existing irrational expenditure patterns reveals the limitations of the respect for revealed preferences as a maxim directing policy. Contrary to Mishan's (1971) claim concerning economists' acceptance of market prices as givens, economics has never uncritically accepted existing valuations. To do so would be to reduce itself to sterility or to a system of apologetics for the status quo. In this matter the willingness-to-pay approach is no better (though no worse) than its human capital counterpart.

The human capital and willingness-to-pay approaches were developed for different purposes and both have useful roles to play. The human capital numbers perform an adequate job of doing what they claim to do, that is, measure the strictly economic costs of disease, as pointed out by Rice and Hodgson (1982). They serve to remind society that the burdens of disease are borne not only by the sick but by all those who would benefit from the contribution to society that would be made if the patient were whole again. However, the assumption that earnings represent the economic value of an individual to society, which disregards the importance of unequal access to education and on-the-job training as well as the value of individuals with no earnings, invalidates the use of human capital values for the choice between governmental programs aimed at different population groups. The difficulty in accounting for pain, suffering, and other factors furthermore invalidates the use of human capital values as complete measures of the benefits from a governmental health program directed at the population as a whole.

The willingness-to-pay numbers, although limited by statistical problems, can play a valuable role in estimating the values that society's members do place on risk in different situations. It is by no means irrelevant to policy that citizens place different values on life

in different situations, and there is no reason for government to impose on itself a straight jacket of superficial consistency in always spending the same amount to reduce a quantum of risk when its citizens do not. But their clear dependence on the existing distributions of income and education concerning health, both of which are affected by governmental programs, invalidate the use of the willingness-to-pay figures as the final arbitrator of proposed health programs and regulations.

A general understanding of the various sorts of answers to cost-benefit questions that would be given by the human capital and willingness-to-pay methods can be obtained by briefly considering the important issue of allocating available funds between programs directed at different social groups. As clearly evident in any table of human capital values, that approach would ascribe highest monetary values to programs reducing the prevalence of disabling health programs for young and middle-aged adults. Within those age groupings, programs benefiting men, whites, and more educated individuals are ascribed higher values than programs benefiting women, blacks, and less-educated individuals.

No corresponding published tables exist for ascertaining the willingness-to-pay values that would be ascribed to programs benefiting particular social groups, largely because the statistical methods used to obtain willingness-to-pay numbers are too crude to allow anything but an average valuation for the population as a whole. Some idea of what values for alternative social groups would be derived from an ideal willingness-to-pay study can be derived from the economic literature on work-place hazards, however. Viscusi (1978) argues cogently that workers with lower implicit valuations of health and safety will be found most frequently in the most dangerous jobs, precisely since they are willing to accept employment in such positions at lower rates of monetary compensation than are other workers. In a competitive labor market, the level of hazard in a person's job thus offers some insights into that person's willingness to pay for safety. By implication, men, blacks, young workers, and those with fewer years of education have a lower willingness to pay for safety than do women, whites, older workers, and those with more years of education, since the former groups have been found to be overrepresented in the more hazardous occupations (Robinson 1984).

Using these value orderings, human capital and willingness-to-pay methods would, in some instances, give the same answer to the

question of how to establish priorities for expenditures and in some instances give different answers. The willingness-to-pay approach would tend to be more generous than the human capital approach in funding heart disease reduction programs relative to automobile accident control programs, for example. Heart disease disproportionately affects middle-aged and elderly individuals, who have both the financial means and the personal experience with health problems that prompt relatively high implicit values on risk. The human capital approach would place greater weight on reducing automobile accidents than would the willingness-to-pay approach, since the young people who disproportionately fill the accident reports are also those individuals with long and productive lives potentially in front of them, even though their risk-taking behavior behind the wheel reveals low implicit valuations of their own lives.

The difference in results that would be obtained from the two methods of ascribing monetary values to health programs can be illustrated most vividly in the case of suicide, the fifth most common cause of death in the United States after heart disease, cancer, cerebrovascular disease, and accidents (U.S. Department of Health and Human Services 1984). By definition, victims of suicide place a very low implicit value on their own lives, and, hence, suicide prevention programs would be given short shrift by a consistently applied willingness-to-pay approach. The human capital approach would emphasize the social costs of such individual decisions, however, and ascribe relatively high values to suicide prevention programs aimed at young and middle-aged people. Suicide rates are highest for persons aged 65 and over, however, and prevention programs aimed at this group would not fare well under a human capital approach.

One could continue with such examples indefinitely without arriving at a point where either method of valuing lives proved consistently more desirable than the other. Realistic situations could always be imagined that would render absurd or abhorrent a maxim to always pattern governmental health funding priorities on the behavior patterns followed by affected individuals or, on the other hand, to never take into account expressed preferences. The important point is that both the human capital and the willingness-to-pay approaches can be valuable aids to public policy formulation, but neither should be allowed to substitute for it. The political process takes account both of the existing preferences of the (politically organized) sectors of the population and of the legislators' views of the longer-term best interests of their

constituencies. Democratic principles insist that this process, with all its problems, is still the best vehicle for making important decisions.

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