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ECONOMIC TECHNIQUES

KEVIN B. SMITH

Even a cursory rummage through the tool kit of policy scholars should be enough to reveal a dominant manufacturer's label: "Made in Economics." For or good or bad, much of quantitative policy analysis rests squarely on a set of concepts and techniques that are imported directly from economics.

Policy analysts borrow so heavily from economics for their conceptual and analytic gear for good reasons. Public policy can be thought of as a purposive course of action undertaken by public authorities, specifically some action designed to resolve some problem or produce some desirable state of affairs that would not occur without government intervention (Anderson 1994, 5–6; for broader introductions to the assumptions underlying policy analysis, see Haveman and Margolis 1970; Knetsch 1995). Such actions invariably involve allocating scarce resources, an issue of central concern to the discipline of economics. Much of the conceptual and analytical tool kit economists employ for understanding and explaining how markets allocate resources—efficiency, the notion of the rational actor, the importance of marginal analysis—are readily transferable to public policy.

These tools are applied to a broad variety of tasks in policy analysis and detailing all of them and their uses would require a book unto itself. Accordingly, this chapter has more limited aims. What I intend to accomplish here is to provide a basic introduction to some of the conceptual and analytical tools borrowed from economics to understand and assess questions of social choice.

The reason for this focus is simple. At the heart of most public policy making is a fundamental question: What should we do? In other words, given the scarce resources government has at its disposal, to what purposive action or actions should those resources be dedicated? It is the job of all *ex ante* policy analysis to provide answers to such questions. Economics provides a set of tools well suited to that job.

These tools are both conceptual and analytic. They provide a theoretical basis for judging the relative worth of competing policy alternatives, and a set of methodological techniques for calculating and analyzing that worth. What follows is a basic tour of these economic tools and how they can be usefully applied to study policy questions centered on social choice problems.

1. CONCEPTUAL TOOLS

A fundamental contribution of economics to the study of public policy is a set of conceptual tools readily transferred from the market to questions of social choice. These tools mostly originate in the discipline of welfare economics, which is the branch of economics concerned with the normative properties of markets (see Zeckhauser and Schaefer 1968; Just, Hueth, and Schmitz 2004). The main objective of welfare economics is to assess the impact of economic activity (or economic policy) on the well-being of society.

This focus on society's well-being provides a strong parallel with the study of public policy. Presumably, governments enact public policies with the general objective of serving the public interest and promoting social welfare. One of the difficulties faced by governments, and by policy analysts is determining what actions will best accomplish this goal. This is the classic conflict of social choice: How should government employ its limited resources? In other words, what purposive actions will best serve the public interest?

Welfare economics helps analysts systematically answer such questions by providing a set of conceptual tools to define and measure the impact of policy alternatives on social welfare. Collectively, these tools represent what has been termed the "welfare economics paradigm" of policy analysis, and they serve as the theoretical and methodological foundation for a broad range of policy scholarship (Munger 2000, 24).

This foundation rests on two core normative assumptions. First, an individual's welfare is best defined by, and only by, that individual. The assumption is that individuals can best decide for themselves their own wants, needs, and levels of satisfaction (Campen 1986, 28). Social welfare in turn is simply the aggregation of these individual-level perceptions of satisfaction. Second, that the "basic goal of society is assumed to be the maximization of social welfare" (Halvorsen and Ruby 1981, 13). These assumptions provide the value-based benchmark for assessing alternative courses of action: Given a choice, the preferred course of action is the one that contributes most to the maximization of social welfare. This will be the choice that maximizes individual levels of utility or satisfaction.

Welfare economics puts this notion of social welfare into practice using the concept of efficiency. The latter is a much misunderstood and maligned term, and

is often seen as reflecting anti-democratic tendencies. Yet from the perspective of welfare economics, efficiency carries surprisingly little normative baggage: it is simply a characteristic of a distribution of resources. To welfare economics, the most efficient distribution of resources is one that maximizes consumer (or citizen) preferences.

Economists have long argued that markets are the most effective means of maximizing those preferences, and thus maximizing social welfare. A market can be thought of as any social arrangement (formal institutions and/or a set of social norms) that promotes exchange. Markets, at least under certain conditions, pull off the remarkable trick of allocating resources in a way that maximizes social welfare, without requiring much in the way of coordinated collective action. Markets, then, share some of the functions, if not the intent and process of government and public policy, which also exist to allocate scarce resources and promote the social good.

At least as far back as Adam Smith, economists have recognized that allowed to barter and truck as they please, individuals pursuing nothing but their own self-interest can produce positive collective outcomes. Supermarket chains, for example, are in a fairly cutthroat business. Given a choice, customers will patronize stores that have the most appealing combination of price, quality, and convenience. Supermarkets compete ferociously to provide the best combination of those factors. The collective outcome of this process of exchange is wide availability of high-quality foodstuffs at reasonable prices—social goods that benefit all and are produced with little in the way of central coordination or goals.

The technical definition of efficiency welfare economics uses for judging the collective outcome of market exchange is the Pareto criterion. A Pareto outcome is an allocation of resources where "no alternative allocation can make at least one person better off without making anyone worse off" (Boardman et al. 2001, 26). In other words, a Pareto outcome represents a universally desirable equilibrium where everyone, more or less, is satisfied with how resources are distributed (Weintraub 1983). A central principle of economic theory is that markets produce Pareto outcomes when certain conditions exist (these including these include perfect information, free entry and exit to the market, and no negative externalities—see Nas 1996, 19).

These conditions are generally recognized to be theoretical ideals rather than factually descriptive. Assumptions of perfect information, free entry and exit, etc. are virtually never fully realized in systems of exchange. In other words, while markets in theory produce Pareto outcomes, in practice they rarely do so. Markets for many goods, however, approximate these conditions closely enough to allocate resources reasonably efficiently (think supermarkets). And even though Pareto outcomes are hard to achieve fully in practice, the Pareto criterion is still valuable because it serves as a benchmark to measure the extent to which a market maximizes social welfare. The Pareto criterion can be pressed into the same service for judging the outcomes of public policy, i.e. providing a conceptual basis for measuring the relative change in social welfare.

Governments, of course, are very different beasts from markets, and even in theory we cannot just assume efficient outcomes are a natural product of democratic

decision making or bureaucratic implementation. In making public policy, government allocates resources through a process of centralized coordination backed by the coercive powers of the state. Contrast this with a market, where (in theory) there are no collective decisions, collective outcomes being the product of accumulated, individual actions. Public policy on the other hand, represents a collective decision that government will impose on individuals whether it suits their interests or not.

These differences are exacerbated by the type of goods that markets and government actually produce and distribute. Governments deal primarily with public goods such as clean air and law enforcement, i.e. goods that are non-rivalrous (one person can consume the good without preventing another from consuming) and non-exclusionary (excluding people from consuming is costly or impractical). For private goods, individuals can decide how much they want to consume and markets will set the price based on supply and demand. For public goods, government decides how much they will pay for a set quantity that will be consumed by all (Nas 1996, 32–3).

Despite these differences, there is a fundamental similarity here: Both markets (through a process of free exchange) and governments (through the policy-making and implementation process) allocate scarce resources. Despite the difference in the means of allocation, the Pareto criterion can be used to judge the ends in both cases. The Pareto notion of efficiency provides the conceptual means to assess a collective outcome, to judge how well it serves the ultimate objectives of society, regardless of whether it is a product of a market or a public policy.

All these theoretical differences between market and government approaches are not as clear-cut in practice as they are in theory. There exists a large class of quasi-public goods that both government and the market play a hand in providing. Public and private schools provide educational services, for example. The existence of these quasi-public goods has provided a fertile ground to develop economic theory as democratic theory. Public choice, for example, is basically neoclassical economic theory translated into a normative theory of democratic politics (Ostrom 1973; Buchanan and Tullock 1962; Friedman 1962). In the policy realm, public choice emphasizes creating market-like conditions for the provision of public goods and services through programs such as contracting out, school choice, pollution credits, and the like. Foundational to such arguments is the notion that social welfare is maximized when individuals are allowed greater freedom to make the choices they believe will increase their own utility—in other words, efficiency is already a driving justification for a broad range of public policies and programs (for a overview see Frederickson and Smith 2004, 185–206).

In short, there already exists both in theory and in practice, a considerable overlap between markets and governments. At least in theory, and perhaps in practice it is a straightforward matter to transfer the concept of efficiency from the market production and distribution of private goods to the government production and distribution of public goods. Under the Pareto criterion an efficient public policy is one that alters the status quo such that at least one person is better off, and no one is worse off. In practice, of course, the task is considerably more complex.

The central obstacle with making the economic concept of efficiency the basis for assessing policy alternatives or outcomes is that public policies rarely hold even the theoretical possibility of a true Pareto outcome. A good deal of public policy is deliberately redistributive in nature, meaning that by design it imposes costs on one group to provide benefits to another. In other words, government action may improve the welfare of some individuals at the expense of the welfare of others. These sorts of situations are obviously at odds with the Pareto criterion.

Such situations are also exceedingly common elements of the political arena. A lot of political conflict centers on the question of who will bear the costs and who will reap the benefits of policy decisions. As virtually all policy options will produce losers as well as winners, the Pareto criterion is of little practical help in assessing which policy option best serves the overall goal of maximizing social welfare.

Because of these difficulties, efficiency is typically transferred to questions of social choice using a modified concept called the Kaldor–Hicks compensation principle, which was independently formulated by two British economists (Kaldor 1939; Hicks 1939). This principle defines efficiency using the concept of net benefits; it judges the social worth of a policy by looking at whether it creates more gains than losses. Technically, Kaldor–Hicks states that if those who benefit from a policy can use their gains to offset the losses borne by those who bear the costs of the policy, then that policy is *potentially* a Pareto outcome. As Boardman et al. (2001, 27) succinctly put it: "If a policy has positive net benefits, then it is possible to find a set of transfers, or side payments, that makes at least one person better off without making anyone else worse off."

It is important to recognize that such side payments are purely theoretical—the winners do not actually have to compensate the losers for the policy to be judged efficient. In layman's terms, Kaldor–Hicks means a policy whose benefits are greater than its costs is deemed efficient, and thus helps maximize social welfare.

This notion of efficiency is controversial for obvious reasons. Policies may yield a positive net benefit, yet bring misery to those who bear the costs. Those who have their communities cut in two by highway projects, for example, may find small comfort in the argument that their loss is outweighed by the benefits to passing motorists. While there is an undeniable logic to the notion of judging social welfare from the Kaldor–Hicks perspective, such situations would strike many reasonable people as unfair.

Given this, it is unsurprising that the Kaldor–Hicks notion of efficiency is criticized as a highly subjective notion of social welfare. It represents a not insignificant modification of the normative assumptions underpinning that notion of social welfare sketched above (especially in terms of social welfare being an aggregation of individual welfare), and there are reasonable criticisms that this recalculated notion of the social good sits uneasily with other values highly prized by democratic systems such as equity and minority rights (for discussions of such issues, see Williams 1972; Kelman 1981; Goodin and Wilenski 1984).

In response to such criticisms, welfare economists defend Kaldor–Hicks as closely allied to the philosophy of utilitarianism. Utilitarianism essentially argues

for pursuing public policies that increase the *average* utility of citizens, and doing so is assumed to promote the greatest good for society. Around an average increase, however, individual utility can vary considerably, from healthy gains to devastating loss. Utilitarianism is often criticized on the grounds that it offers individuals no guarantee of a minimum allocation of resources, a criticism that is equally applicable to Kaldor–Hicks. As a basis for judging public policy, both Kaldor–Hicks and utilitarianism weight the aggregate gain over the loss of any particular set of individuals (Weimer and Vining 2005, 135; Posner 1983).[1]

Philosophical pros and cons aside, the big advantage in using Kaldor–Hicks as the basis for policy analysis is sheer practicality. This concept of efficiency provides a straightforward benchmark for judging public policies: Given a set of policy alternatives, choose the option that produces the greatest net benefit. Though substituting the notion of a potential Pareto outcome for an actual Pareto outcome, this approach boils the challenge of measuring changes in social welfare down to something that is analytically manageable. To figure out which policy best maximizes social welfare an analyst simply needs some means to calculate the net benefits of the alternatives.

Under Kaldor–Hicks, then, measuring relative changes in social welfare comes down to measuring net benefits. Yet in order to calculate the relative costs and benefits of a given policy alternative, it is first necessary to have some understanding of what costs and benefits are and how (economic) values should be attached to them. The basic conceptual tool for achieving these goals and measuring changes in social welfare is willingness to pay (WTP).

WTP is an intuitive way to attach values to costs and benefits. WTP is simply the maximum amount that an individual would be willing to pay for a good or a benefit, or how much they would want in return for giving up the utility derived from that good or benefit (these are assumed to be the same thing). WTP thus attaches an economic value to the utility of a good or service being consumed (Campen 1986, 29).

WTP is similarly used for valuing costs. Economics conceives of costs as opportunity costs, which are defined as the benefits that could be gained by putting resources to their next best use (Stokey and Zeckhauser 1978, 151–2; Fuguitt and Wilcox 1999, 46). For example, let's say I have enough money to buy a pint of beer or a bag of peanuts. I opt for the beer. The opportunity cost of the beer is the benefit, or satisfaction I give up by not consuming the peanuts. That cost, i.e. the benefit I would derive from the peanuts, is defined by my WTP for the peanuts.

WTP thus provides the means to measure changes in individual welfare by providing a conceptual basis to attach values to costs and benefits. Aggregate these concepts to the collective level, and WTP provides a way to measure social welfare. Let's say a public body is faced with two alternatives, A and B. If at least one person has a higher WTP for alternative A, and no one has a higher WTP for B than for A,

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[1] This chapter is designed to explicate the basic conceptual and analytical tools policy analysis borrows from economics. It is not designed to provide a full blown critique of the normative implications of putting those tools into practice. Readers interested in those implications are directed towards Haubrich and Wolff, this volume, which is devoted to just such a critique.

then alternative A is more efficient and maximizes social welfare (this situation represents a Pareto outcome). If we add up the WTP for every individual for each alternative both in a positive and negative sense—i.e. we measure the costs and benefits each individual attaches to the two alternatives and subtract costs from benefits—the alternative with the highest net positive total is efficient under the Kaldor–Hicks compensation principle (Campen 1986, 29–30).

This basic idea of valuing social welfare can be readily conveyed by the notion of consumer surplus. Consumer surplus is simply the difference between WTP for a good or a service and what they actually pay for that good or service (Mishan 1975, 24; see also Willig 1976; Harberger 1971). So if I am willing to pay five dollars for a beer and the beer actually costs two dollars, the consumer surplus in this transaction is three dollars. In theory, there is no obstacle to aggregating willingness to pay and applying it to public policy. In comparing policy alternatives, the option that maximizes consumer surplus is more efficient and makes the greater contribution to social welfare.

Despite its theoretical simplicity, consumer surplus is complicated in practice by several factors. One such factor is that willingness to pay for most goods and services is variable. The maximum amount I am willing to pay for one beer after a hard day's teaching is different from the maximum amount I'm willing to pay for a second beer. Technically, this is what's known as diminishing marginal utility, which simply means the personal satisfaction I get from consuming beer diminishes with each pint I put away. The same principle applies in the aggregate. For example, consider a program to build parking garages to ease a shortage of parking spaces in a central city. As more and more parking spaces become available, the social utility of each additional parking space diminishes, and therefore so does the willingness to pay. The value of the parking garages, in other words, is not simply a matter of subtracting the costs of construction and operation from the estimated revenue from parking fees. The social value of the parking garage depends on what motorists are willing to pay for a parking space, and what they are willing to pay will vary based on how many parking spaces are available.

All this variability, at least in theory, is relatively easy to deal with through marginal analysis. Imagine a graph where the x-axis represents units of a good, and the y-axis represents the maximum amount the individual is willing to pay for that good. A basic demand curve can be drawn connecting the WTP for the first unit of the good all the way down to where consuming one more unit has no utility at all and willingness to pay for that additional unit drops all the way to zero.

Assuming a linear demand curve, the resulting picture should look like a right-angled triangle with the demand curve sloping from the y-axis downward and to the right where it connects to the x-axis. Now, go up the y-axis to the actual price paid for the good and draw a horizontal line out to the demand curve. This dissects the larger triangle into two smaller shapes, the upper being a triangle with the horizontal line representing price paid as its base. The area represented by this triangle represents consumer surplus—the net value to the individual of consuming the good to the point where the price of the good and willingness to pay intersect, and consumption stops.

The same basic principle can be applied to public polices or programs by simply aggregating demand curves relative to public goods or programs. Imagine the y-axis representing parking fees and the x-axis representing parking spaces. As long as there is some reasonable estimation of aggregate demand (the collective willingness to pay for each additional parking space), the consumer surplus is calculated in exactly the same way, i.e. as the area above the parking fee charged and below the willingness to pay represented by the demand curve.

The practical challenge and the real complicating factor for putting the welfare economics notion of social welfare into analytic practice is the fact that WTP is generally unobserved. It is easy to observe what is charged for a good. The WTP for an individual—let alone a municipality or a county or a country—is rarely immediately evident. Much of the methodology of the welfare economics paradigm is employed to generate estimates of WTP, to in effect produce reliable demand curves for the consumption of public goods and services (for a detailed survey of such techniques, see Boardman et al. 2001).

Despite the methodological challenges, what should not be lost is that there is an underlying intuitive simplicity to the conceptual tools welfare economics uses to define and measure social welfare. Certainly all of the ideas represented in this section can be summarized very succinctly: Efficiency is nothing more than a characteristic of the distribution of resources. The optimal distribution of resources to maximize social welfare is a Pareto-optimal distribution, which can be roughly thought of as the distribution that maximizes the preferences of all citizens. Because the opportunities to maximize the preferences of all citizens are rare (especially with public policy) a more practical modification—the Kaldor–Hicks compensation principle—is used. Kaldor–Hicks recognizes that altering distributions of resources will often result in winners and losers. Kaldor–Hicks adopts the utilitarian perspective that if the gains of the winners outweigh the losses of the losers, society gains in the aggregate and such a distribution can thus be viewed as efficient. These conceptual tools can be used to fashion a set of practical analytic tools to study public policy.

2. BASIC ANALYTIC TOOLS: COST ANALYSIS

The conceptual tools discussed in the previous section can be applied analytically using a number of different methodologies. One of the most common approaches to applying the Kaldor–Hicks concept of efficiency is cost analysis. Indeed, cost analysis can generally be thought of as a methodology to calculate the efficiency of policy alternatives.

Cost analysis is not a technique, but rather an umbrella term for a variety of techniques that include cost–benefit analysis (CBA), cost–effectiveness analysis (CEA), cost utility analysis (CUA), and cost feasibility analysis (CFA). These tech-

niques (especially CBA) constitute the primary economic tools used by policy scholars to analyze problems of social choice (Levin and McEwan 2001, 27–8 provide an excellent summary of the various cost analysis approaches). Though readily adaptable to *ex post* policy studies, the most commonly employed cost analysis techniques—especially CBA and CEA—are used almost exclusively as *ex ante* techniques (Boardman et al. 2001).

Essentially, the big attraction of cost analysis is that it offers a way systematically (and its most fervent proponents would argue, objectively) to judge the social worth of alternative policy options. If, for example, policy makers are focused on the problem of high secondary school dropout rates, there will undoubtedly be a constituency for a wide range of responses to this problem: smaller classes, vouchers, more qualified teachers, after-school programs, a back-to-basic curriculum; the potential policy permutations are virtually endless. Given limited resources, which of these alternatives should policy makers pursue?

Such problems of social choice are common in public policy decision making and represent a significant challenge to policy analysts for two reasons. First, there are high levels of uncertainty in *ex ante* analysis. Exactly what a program or policy will achieve is unknown until it is implemented and its outcomes analyzed. Proponents of, say, vouchers may argue their favored policy will result in fewer dropouts, and will cut educational costs with no adverse consequences. Until a voucher system is actually in place and given time to work, however, the empirical merits of such a claim are unknown.

Second, the notion of what best serves the public interest or makes the greatest contribution to social welfare is very much in the eye of the beholder. Partisan or ideological preference—even outright self-interest—can heavily influence perceptions of what policy is judged to be the best use of public resources. Given this, on what objective basis can policy analysts claim to rank the merits of one policy option over another?

Cost analysis is designed to provide one potential answer to this question. Distilled to its essence, the central objective of most forms of cost analysis is to estimate the relative efficiency (of the Kaldor–Hicks variety) of competing policy alternatives. This is practically achieved by calculating ratios of policy inputs to some measure of outcomes. The inputs represent the resources a program or policy consumes, which theoretically (though not always in practice) are valued as opportunity costs. The outcomes represent the expected real-world impacts or performance of the program or policy. The latter are actually translated into economic values using the WTP approach in CBA, though in other forms of cost analysis theoretical purity typically bows to a more rough and ready notion of efficiency (though one still that clearly springs from the Kaldor–Hicks principle). The logic is simple: however calculated, these ratios allow a comparative judgement of which policy option will provide more of the desired outcomes at the least cost. In economic terms, these are viewed as measures of the relative efficiency of the policy alternatives.

In addition to providing a practical basis for calculating the efficiency of policy alternatives, cost analysis can also address (though not fully solve) the uncertainty