Chapter 17: Economics and the Good Society

> The preceding discussion makes it plain that any rigid inference from effects on economic welfare to effects on total welfare is out of the question. In some fields the divergence between the two effects will be insignificant, but in others it will be very wide.
>
> Nevertheless, I submit that, in the absence of special knowledge, there is room for a judgment of probability. When we have ascertained the effect of any cause on economic welfare, we may, unless, of course, there is specific evidence to the contrary, regard this effect as probably equivalent in direction, though not in magnitude, to the effect on total welfare; (A. C. Pigou. *The Economics of Welfare*, KL: 438-443).

I. Introduction: The Utilitarian Foundations of Welfare Economics

To this point, we have explored some implications of rational decision making in the sense of optimization in various choice settings and used those implications to understand why firms produce and sell what they do, the prices at which such goods, the factors that can induce changes in both those activities, and various interdependencies among choices, choice settings, and the extent and growth rates of market networks. The analysis has been "positive" in that no claims were made about whether the outcomes that emerge from the great networks of voluntary exchange are "good" or "bad" desirable or not, "moral" or not. Such conclusions were left to the reader's own internalized beliefs about such things.

This chapter explores some of the normative ideas that have been used by economists to assess whether markets or "good" or not, and whether the markets that emerge are as "good as possible" or not. This area of study was given the name "welfare economics" or "the economics of welfare" by Arthur Pigou in 1920. That name is a bit confusing for American readers, where the term "welfare" is not a description of the quality of one's life and community, but rather to describe a particular set of public policies designed (at least in principle) to improve the lives of the poorest persons in their society. What Pigou had in mind was the utilitarian project, the efforts of an important group of philosophers and public policy reformers to determine the nature of a "good society" and how to move towards such a society.

The modern form of that project, which goes back at least as far as Aristotle, began with Jeremy Bentham's work in the late eighteenth and early nineteenth centuries. Bentham is the first to clearly state the possibility of mutual gains from trade and to insist on what would later be called methodological individualism—the approach to social science that insists that all social phenomena should be explained in terms of individual decisions and interests. A methodology that has neoclassical economics since its beginning. This is not surprising once one realizes that many of the most prominent microeconomists of the late nineteenth and early twentieth centuries were themselves utilitarians of one variety or another. Utilitarians who were interested in markets wrote the first economic textbooks, and they were often pioneers in economic analysis—including the marginal revolution of the late nineteenth century.

In a nutshell, the utilitarian normative perspective is that an activity, rule, or public policy is "good" or "morally proper" if and only if it tends to increase the sum of utility in the community of interest (where utility is interpreted as the extent of personal happiness or satisfaction). If, on the other hand, if an activity, rule, or public policy tends to reduce the sum of utility in a community, it is an immoral activity, a bad rule, or a welfare decreasing public policy—and should be avoided by all virtuous persons. Voluntary exchange from this perspective is a good activity because the parties involved must each benefit from every exchange—unless fraud or coercion is involved or the trade harms other persons not directly involved in the exchange.

The latter argument, together with Adam Smith's conclusion that market activities tend to be self-regulating and to make societies wealthier in the long run, helped persuade politicians throughout the West to deregulate markets, stop selling monopoly privileges, and to open occupations up to all persons qualified (skill-wise). These reforms greatly increased the openness and competitiveness of markets, which as part I of the text demonstrates, tends to increase the scope of trade. The latter being a virtuous activity from the perspective of utilitarian normative theory. From this perspective, market activities—exchange, production, innovation—were generally "good" rather than morally neutral or to be avoided because they undermined virtue.

As neoclassical economics developed and utilitarian ideals were sharpened, utilitarians began to wonder whether markets produced the very best outcomes for society—those which maximized the sum of utilities (or in some cases the products of utilities). This lead Pigou and others to use what might be called monetized indices of utility to approximate aggregate utility, which allowed stronger claims to be made about whether the sum of utilities (aggregate utility or aggregate welfare) could be increased through particular public policies—including economic regulation. Perhaps, surprisingly, there were many disagreements about whether particular policies increased social welfare or not among utilitarians—and these continue through to the present.

Utilitarian normative theory is not the only one used by economists, but it and variations of it are the most common. A few economists have used other normative ideas to appraise the relative merits of activities, rules, and public policies including the Pareto criteria and contractarian approaches, but the utilitarian one continues to be the most commonplace. A subset of these have been explicitly incorporated into public policies governing the creation of new regulations, such as cost benefit analysis.

In this chapter, provide overviews of the normative theories used most frequently by contemporary economists. As true of the other topics covered in this book, welfare economics is a very large field, and the aim of the chapter is to provide an overview of the main or core theories and conclusions rather than a comprehensive overview of the literature—which would take at least a full-length book or two to do reasonably well.

II. The Pareto Norms and Voluntary Exchange

We'll start with one of the simplest normative ideas, one that is attributed to the Italian socio-political economist Vilfredo Pareto. A change from one social state (A) to another (B) is said to be a Pareto superior move, if and only if at least one person is better off at B than at A, and no one is worse off. In utility terms, this occurs when at least one person realizes additional utility at B relative to A, and no one realizes more utility at A than at B. A social state (C) is said to be Pareto optimal or Pareto efficient if no Pareto superior moves for C are possible. Any move from C would either many no one better off than they were at C, or it would cause at least one person to be worse off than they were at C. (Thus, most moves away from a Pareto optimal state would violate the do no harm principle.) If it there is a unique Pareto optimal state, all moves away from that state would violate the "do no harm principle."

The Pareto Norms in a Simple Trading Game

A simple game-matrix representation of trade without transactions costs can be used to illustrate the Pareto normative criteria. Suppose that Al is a seller and Bob is a buyer, and that there are unrealized potential gains to trade between Al and Bob. Trade requires offers to be made and accepted. The payoffs are in net-utility gained, or lost relative to their original position, before this potential trading opportunity emerged.

Table 16. 1 Gains from Trade without Transactions costs			
		Bob (a potential buyer)	
		Accept Offer	Do Not
Al (a potential seller)	Make Offer	3, 3	0, 0
	Do Not	0, 0	0, 0

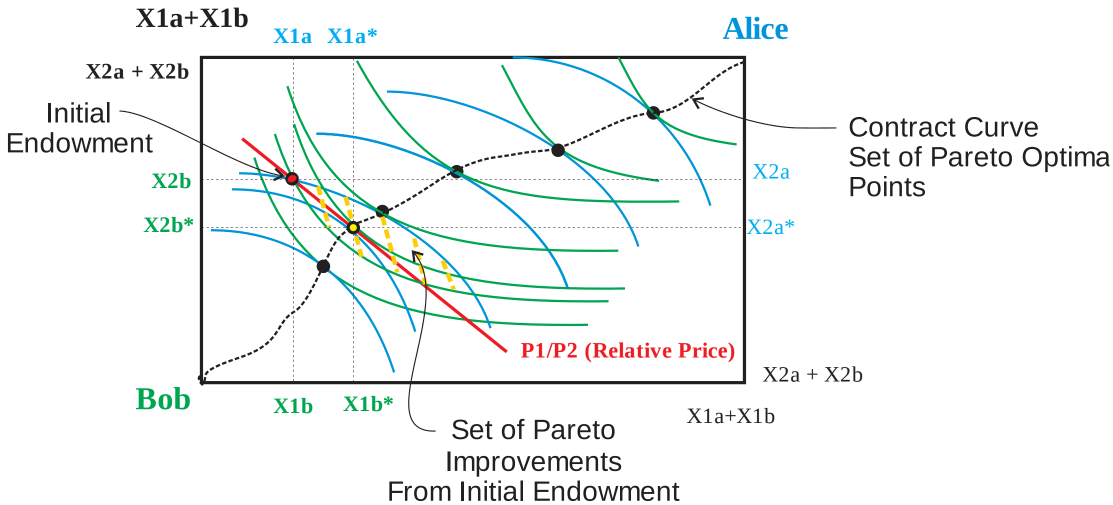
Notice that the (3,3) cell is Pareto superior to the other three cells. Both traders realize higher utility in that cell than the others, so both would be better off shifting from any of the other cells to the upper lefthand cell. Once the (3,3,) cell is reached, no other Pareto superior move is feasible (because of the assumptions of the trading game represented). Thus, the upper lefthand cell is Pareto optimal. A move away from that cell to any of the others, would make each worse off.

Nonetheless, there are two Nash equilibria in this game matrix, the upper lefthand corner and the lower lefthand corner. However, only one of the equilibria is Pareto optimal. (Although it could be argued that the strategy of making and accepting offers is a weakly dominant strategy for each, because that strategy always yields a payoff that is at least as great as those associated with the no-trade outcomes. If that weakly dominant strategy is adopted by both traders, the (3,3) cell emerges as the equilibrium.)

The Pareto Norms in an Edgeworth Box

An Edgeworth box can be used to develop a somewhat more nuanced illustration of the Pareto principles. Figure 16.1 is a somewhat more detailed version of the Edgeworth box used in Chapter 5. It begins with the same initial endowment and includes the same market clearing price line. For the present chapter, however, we are more interested in the areas that characterize the possibilities for realizing mutual gains to trade and the points where such gains from trade do not exist (which are the various sets of Pareto superior and Pareto optimal outcomes) than in characterizing an equilibrium price.

Figure 16.1 The Pareto Criteria in
an Edgeworth Box



Given the initial endowment, the two indifference curves and lens-shaped area between the two indifference curves that pass through the initial endowment point represent all the points in the Edgeworth Box that are Pareto Superior to the initial endowment. They are all the points, (combinations of the two goods) that could make at least one of them better off without making the other worse off.

The points that are Pareto optimal are points where Al and Bob's indifference curves are tangent to one another. Any move from such a point will make at least one of them worse off. The set of all such points is sometimes referred to as the Pareto set, or in the case of an Edgeworth box, the contract curve. That curve is traced out and labelled in the box. Note that part of the contract curve lies within the set of allocations that are Pareto superior to the initial endowment. Those are the subset of Pareto optimal outcomes that can be reached through a series of Pareto superior moves. Note that the equilibrium price is just one of these possibilities. (If there is more than one equilibrium price vector, it would identify another point along the contract curve within the set of Pareto superior points.)

The Pareto optimal points in a given choice setting are not always unique, although there are cases in there is only a single Pareto optimal possibility, as in Table 16.1. The fact that there are Pareto optimal points that cannot be reached by a series of Pareto superior moves is also of interest. Pareto superior moves limit one to a subset of the feasible Pareto optimal outcomes—namely those that make at least one person better off an no one worse off.

In a trading situation where there are no posted prices, bargaining between the two players is likely to reach a Pareto optimal point, but which one will depend on the bargaining that takes place. If, for example, Al is the better bargainer, the result is likely to be a point on the contract curve within the set of Pareto superior points that is fairly close to Bob's indifference curve though the original endowment. If they are equally good bargainers, then points in the middle would be more likely to be the final result.

There are no unrealized gains to trade at the points that make up the contract curve. They are all Parete optimal points, so no changes from those combinations of goods are possible that would make one person better off without making the other worse off.

III. Maximizing Social Net Benefits

Chapter 2 began with a model of demand based on the net-benefit maximizing model of individual decision making. Individuals maximized a function from the family of N= B(Q)=C(Q), which implied that they chose a quantity, Q*, which set dB/dQ = dC/dq. That is to say that individuals chose to engage in activities (including the purchase of goods and services that were regarded as consumption) up to the point where there marginal benefits equaled their marginal costs. This was shown both with geometry and with calculus—and only required the assumption that market participants knew their benefits and costs, and that net benefit functions were strictly concave.

In cases where the marginal benefit curve or functions were monotone decreasing in the price of the goods or services purchased, individual demand curves were simply inverse functions of their marginal benefit curves. Demand curves went through exactly the same points as the marginal benefits curves, but rather than being functions from quantities (Q) into dollars per unit (marginal benefits), they were functions from prices (dollars per unit) into quantities.

That individuals may maximize net benefits in a series of separate decisions rather than as a single decision using a lifetime utility function is suggested by the fact that most students find the net-benefit maximizing model to be more intuitive than the geometry and calculus of utility functions. Something like lifetime utility may roughly characterize all the tradeoffs among goods that one might purchase, but the particulars—as with which automobile or which cell phone to purchase—are often decided one good at a time, as assumed in net-benefit-maximizing models of demand and supply.

It turns out that the net benefit maximizing model can also serve as the basis for a quantifiable version of utilitarianism—for reasons briefly summarized by Pigou at the beginning of the chapter. The total benefits realized (in dollars) can be used to approximate the total utility gained by consumers and the total cost of production can be used to approximate the utility sacrificed in other uses by input provider and owners. Social net benefits can thus be used to approximate the net utility gained (or lost) from producing and consuming the goods of interest. Given this, utilitarian logic suggests that one should maximize social net benefits because aggregate utility is likely to be highly correlated with social net benefits.

The maximize social net benefit norm is widely used in public economics as a method for evaluating the effects and relative merits of different forms of markets and alternative public policies. For the most part, this approach is used in a partial-equilibrium framework, one market or one public policy at a time.

The geometry of social net benefit maximization is based on results from chapter 2. Recall that if $b_i(Q)$ is individual i's marginal benefit curve or function for a good or service of interest, then $b^{-1}(P)$, the inverse of the marginal benefit function (if one exists) is individual i's demand function for the good of interest. Market demand (Q^d) is the sum of the individual demand functions or demand curves for all the people purchasing the good in the relevant community, state, nation, or world, thus $Q^d = \sum_{i=1}^{N} b^{-1}(P)$.

The inverse of a market demand function derived in this way is approximately the social marginal benefit curve for the individuals in the market of interest. The social marginal benefit function for a good or service (without externalities) is the sum of the marginal benefit functions for all of the consumers in the market of interest. In other words, the inverse function of a market demand curve, $Q^d$is approximately equal to the sum of the marginal benefit curves of all the individuals in the market of interest, $inv(Q^d(P)) \approx SMB(Q) = \sum_{i=1}^{N} b(Q)$. In cases in which the inverse of a sum of functions is exactly the same as the sum of the inverses, the inverse of a market demand curve will exactly characterize a the marginal benefits realized by all consumers. This is, for example, the case when the individual marginal benefit functions are linear.[1] Essentially the same

[1] There are several proofs of this that can be found with a brief web-search. Using the net-benefit maximizing model directly avoids differences between demand curves derived from utility functions and marginal benefits and the necessity of using Hicksian compensated demand curves instead.

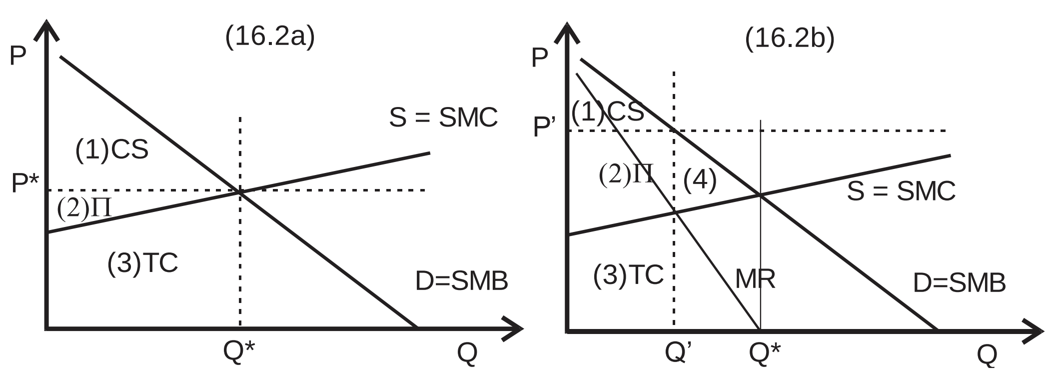
logic can be applied to the Ricardian supply curves that were derived in chapter 4 from cost functions. If c(Q) is a firm's marginal cost curve (and monotone increasing), then its supply function is the inverse of the marginal cost function, $c^{-1}(P)$. Market supply is simply the sum of the individual firm supply functions in the market of interest, $Q^s = \sum_{i=1}^{M} c^{-1}(P)$. In cases in which there are no externalities, the social marginal cost curve associated with producing and distributing the good of interest, is approximately the inverse of the market supply function, $inv(Q^s(P)) \approx SMC(Q) = \sum_{i=1}^{M} c(Q)$.

These two approximations allow us to use estimates of the demand and supply functions to approximate the social marginal benefits and social marginal costs for the good of interest. Social net benefits are simply the difference in the areas under the associated social marginal benefit and marginal cost curves (ignoring fixed costs, or by assuming they are zero in the long run), $SNB(Q) = \int_0^Q SMB(Q) - SMC)Q)\, dQ$.

IV. Social Net Benefits and the Static Deadweight Losses from Monopoly Power

The static normative case in favor of competitive markets over monopolistic markets can be developed using this approach. Figures 16.2a and 16.2b below illustrate the geometry of social net benefit calculations for two types of markets. Figure 16.2a characterizes a perfectly competitive market with price-taking firms. Figure 16.2b characterizes a price making (monopoly's) firm's output decision.

Figure 16.2: The Static DWL of Monopoly



We'll first analyze figure 16.2a. The social benefit is the area under the demand curve from zero to Q* (Areas 1+2+3). The social cost is the area under the supply curve from zero to Q* (area 3).

Subtracting social costs from social benefit yields social net benefits. ([1+2+3]-[3]=[1+2]) Areas 2 and 3, thus represents social net benefits. In this case, social net benefits consists of the sum of consumer surplus (CS) and profit (Π).

Social net benefits, as true of an individual's net benefits are maximized where SMB(Q) = SMC(Q), which occurs at exactly Q*, the quantity produced and sold in a competitive market. This output level is also the Pareto optimal output of the good being modelled. No change in that output (e.g., away from Q*) can be made without reducing someone's net benefits and, thus, making someone worse off.

This is true in both the Marshallian and Ricardian variations of competitive markets, although the supply curve would normally be horizontal in the Marshallian version and profits would equal zero, e.g. every firm makes the "ordinary" rate of return on its investment. In the Ricardian version depicted, some firms earn higher rates of return than the ordinary one, possibly because of their location or good fortune with their personnel.

Notice that at the market equilibrium of competitive markets, price equals the marginal cost of production and the marginal benefit of consumption, but also the social marginal cost of production and the social marginal benefit of consuming or otherwise benefiting from the goods and services produced. Thus, competitive markets are self-regulating in a manner that is consistent with the social net benefit maximizing norm (again in the absence of externalities). The social net benefit maximizing level of a good or service also varies with input prices, the prices of substitutes, and consumer willingness to pay for the good or service of interest.

Next focus on figure 16.2b. That is the case of a "price-making" firm facing exactly the same demand curve and with the same marginal cost curve as the industry's marginal cost curve in figure 16.2a. The price making firm faces a downward sloping demand curve and takes into account how its output affects prices and thereby profits. Such firms will produce where their marginal revenue (calculated from the demand curve) equals their marginal cost, which is denoted as Q' in figure 16.2b. This calculation implies a significantly higher price than that in the competitive market and higher profits for the firm (or firms, if the monopoly is the result of a cartel rather than a single firm's unique product). The social net benefits again consist of profits and consumer surplus (areas 1 and 2), but that the total net social benefits are smaller than they were in the competitive case. Area 4 is no longer included in the area that represents social net benefits. The missing area (area 4) is sometimes called the deadweight loss of monopoly. It characterizes how cartelization or monopolization of a competitive market tends to reduce social net benefits.

Of course, the existence of such losses depends on how the monopoly or cartel was established. If an innovative firm creates a new product that is temporarily protected by a patent, then the social net benefits of figure 16.2b are new and represent (approximately) the increase in social net benefits associated with successful innovation. If Schumpeter is correct in his assessment that large firms are generally more innovative than the smaller firms of competitive markets, there may be dynamic gains from scale that offset some or all of the static losses of monopoly in terms of social net benefits. (Whether this is so or not is an empirical question, and it is likely to vary by market.)

V. Social Net Benefits and Externality Problems

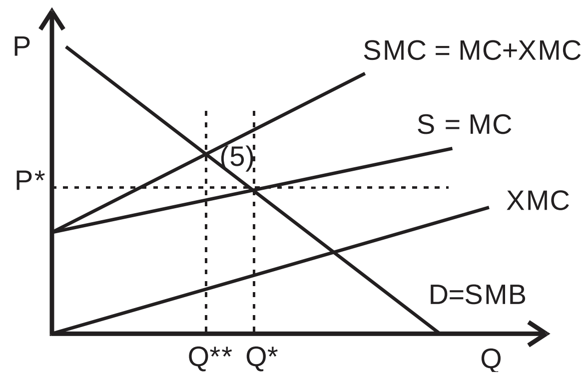
Partial equilibrium analysis of markets focuses on one or at most a few interconnected markets. It makes no effort to characterize entire market networks, nor does it take account of effects on other non-market activities. However, there are many cases in which market activities affect the residents of a community in ways that are not intermediated by markets.

Many folks decorate their houses for holidays, maintain fine gardens in front of their houses, and take steps to assure that their sidewalks are clean neat and flat. Such "consumption" activities produce benefits for others walking past their houses that are not part of a market transaction in the usuals sense. Such fastidious homeowners produce positive "externalities" (spill over benefits) that at least slightly increase the welfare of all or most of those walking past their houses. On the other hand, other neighbors may have parties outdoors that create noises, smoke, and parking problems that reduce the welfare of their neighbors. Such negative externalities (spillover costs) may not be taken into account by those throwing the parties.

Similar externalities are often associated with the production activities by firms. In the late nineteenth century, as large scale production began being commonplace, firms would use the air and water to dispose of waste products at levels that produced noticeable effects—and in some cases health problems. Such spillover costs and benefits are not part of market transactions and may not be taken into account at those generating them—whether firms or consumers. Because of that neglect, such externality generating activities are rarely undertaken at levels that maximize social net benefits.

Figure 16.3 illustrates an externality problem that might emerge from production activities of firms such as air and water pollution or of the uses to which consumers of the goods and services purchased by them. As is usually the case, we'll assume that the externality generators are "pragmatists" that take account of only their own narrow interests (consumer surplus or firm profits). The previous chapter implies that this would not always be the case, but the normative analysis of externality problems nearly always assumes this.

Figure 16.3: Externality Problems



The externality illustrated is assumed to be an external spillover cost that varies directly with the extent of the product sold in this market. The spillover marginal cost is labelled XMC, for eXternal marginal cost. The output produced by a competitive market is, as usual, where supply equals demand, which is labeled Q*. The output that maximizes social net benefit occurs where social marginal benefits equal social marginal cost. As drawn, the demand curve are again assumed to be a good proxy for the social marginal benefits generated by this market. The supply curve again is assumed to be a good proxy for the industry's marginal cost of production. Were these the only costs and benefits, the market outcome would have maximized social net benefits and been Pareto efficient.

However, because of the external costs generated, the social marginal cost curve differs from the direct marginal cost of production. Social marginal costs (SMC) now include both the direct marginal cost of production and the spillover marginal costs associated either with "free disposal" of waste products using the air and water system or the manner in which consumers use the good purchased. The output where SMC equal SMB is labeled Q**. Note that the market produces a greater quantity than that which maximizes social net benefits. The area labeled with (5) characterizes the extent to which social net benefits could be increased if output and/or purchases of the goods of interest were reduced to Q**.

Economists often conclude that solutions require government action in such cases, but chapter 14 suggests that such actions may not always be forthcoming. Moreover, the cost of the policies that would ameliorate the problem should also be taken into account, when making such recommendations. It seems clear that for "small" externalities, the cost of implementing corrective policies is greater than any net benefits recovered—indeed this property could be used as a definition of "small" externalities. In those case, inaction maximizes social net benefits. Nonetheless, it is clear that there are cases where governmental or other actions can increase social net benefits.

A Coasian Solution to Externality Problems

A possible non-governmental solution was suggested by Coase (1962), where he argued that if transaction costs are low, the persons affected by an externality could organize and contract with the firms and consumers in the relevant market to reduce sales and production of the goods generating the externality.

Note that "at the margin" those affected by the externality would be willing to pay up to the vertical distance from the horizontal axis to the XMC curve to have producers and consumers reduce market sales, whereas consumers and producers require little or nothing (initially) to reduce production and consumption of the good. As the bargaining process continues, those affected are willing to pay less and less for reductions (the height of the XMC curve falls as one moves from Q^ to the left), while the amount required as compensation increases (the distance between the demand curve and supply curve increases). The potential gains from such Coasian contracts run out exactly at Q** where the distance from the horizontal axis to the XMC curve exactly equals the distance between the supply and demand curves.

Such contractual solutions clearly become more difficult as the number of persons affected increase, although it bears noting that international environmental treaties closely resemble the agreements that Coase imagines being consummated. Environmental treaties are voluntary agreements among the parties to the treaty—e.g. they are contracts among sovereign nations.

One of the peculiarities of the single market approach is that the social net maximizing output level tends to be unique, and thus there is only a single Pareto optimal output. Coase made use of this property when he developed what is now known as the Coase theorem—that the bargaining solution to externality problems tend to converge to the same output level regardless of whether the market participants have the "right" to engage in voluntary exchange, or if those affected by the externality have veto power over whether they can do so or not. This result holds as long as transactions costs are low (approaching zero) and that the bargains negotiated do not themselves change and any of the curves drawn. The latter in Coase's terms implies that there are no significant income or liquidity effects from the various side-payments used to consummate the contract negotiated.

The Mathematics Behind the Externality Diagrams

The mathematics behind the externality diagram are straightforward and closely mirrored by figure 16.3. Let B(Q) be the social benefit function, C(Q) be the industry cost function, and X(Q) be the external cost function. Net benefits (N) are $N = B(Q) - C(Q) - X(Q)$. Assuming that function N is strictly concave implies that N is maximized at the quantity that sets social marginal benefits equal to social marginal costs,

$$N_Q = B_Q - C_Q - X_Q = 0 \text{ at } Q^{**} \qquad (16.2)$$

Q** is the social net benefit maximizing quantity output of the externality generating activity. Note that this quantity is not normally zero, because benefits as well as costs are associated with it.

To characterize this as a function of parameters of the choice setting requires a bit more descriptive characterization of the three component functions, as with $B = B(Q, P^0, Y)$, $C = C(Q, w, r, T)$, and $X = X(Q, D, A)$, where the parameters of the demand and supply functions are the usual ones, and those of the external cost function include population density (D) and wind or air speed (A). Given that richer characterization of the B, C, and X functions, the implicit function theorem implies that $Q^{**} = q(P^0, Y, w, r, T, D, A)$.

The implicit function theorem can, in turn, be used in the usual way to characterize how the social net benefit maximizing level of output in this market varies as those parameters change.

Ameliorating Externalities with Economic Regulation(s)

When the social net benefit maximizing outcomes such Q** do not arise from the behavior of the individuals involved, government regulations of various kinds can potentially increase social net benefits. Assume that regulation R can reduce output in this market and is undertaken to maximize social net benefits. However, creating and implementing regulations is a costly activity and those costs should be taken into account when evaluating the relative merits of regulatory solutions. Suppose there are costs associated with implementing the regulation(s) of interest that can be characterized as, E=e(R). In the above case, the social net benefit maximizing stringency of regulation R can be determined by maximizing:

$$N = \mathrm{B}(\mathrm{Q}(\mathrm{R}), \mathrm{P}^0, \mathrm{Y}) - \mathrm{C}(\mathrm{Q}(\mathrm{R}), \mathrm{w}, \mathrm{r}, \mathrm{T}) - \mathrm{X}(\mathrm{Q}(\mathrm{R}), \mathrm{D}, \mathrm{A}) - \mathrm{e}(\mathrm{R}) \quad (16.3)$$

The ideal regulation in this case satisfies the following first order condition.

$$N_R = \mathrm{B}_Q \mathrm{Q}_R - \mathrm{C}_Q \mathrm{Q}_R - \mathrm{X}_Q \mathrm{Q}_R - \mathrm{E}_R = 0 \text{ at } \mathrm{R}^* \quad (16.4a)$$

or

$$N_R = [\mathrm{B}_Q - \mathrm{C}_Q - \mathrm{X}_Q]\mathrm{Q}_R - \mathrm{E}_R = 0 \text{ at } \mathrm{R}^* \quad (16.4b)$$

Note that the term inside the brackets is the first order for maximizing social net benefits with costless policies. The implementation and administrative costs imply that the regulation should aim for a bit smaller reduction in output than the diagram suggests—when the costs of implementation are taken into account.[2]

The implicit function theorem can, in turn, be used in the usual way to characterize how the social net benefit maximizing regulations (if any) varies as market and regulatory parameters change.

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[2] Environmental regulations often mandate that producers use specific emission reducing devices (E) and then monitor both the installation and the performance of the devices installed. Calculating the ideal stringency of such devices, E**, would be undertaken in a similar, but not identical, way to that used to characterize equation 16.2. In this case, X would be a function of the rigor of the emissions inhibiting device, E. Annual social net benefits would be $\mathrm{N} = \mathrm{B}(\mathrm{E}) - \mathrm{C}(\mathrm{E}) - \mathrm{X}(\mathrm{E}) - \mathrm{e}(\mathrm{E})$. If the emission inhibiting device somewhat reduces the quality of the product sold (to the average consumer) as some emissions inhibiting devices reduce auto fuel economy or power, then $B_E<0$. The marginal cost of using such devices is normally greater than zero as are the administrative costs of the regulation.

Social net benefits would be maximized when $X_E=-B_E + C_E + E_E$. The optimal rigor of the emission reducing device, E**, sets the reduced marginal loss from external costs (the marginal benefits from the emissions device) equal to the marginal cost of the emission reducing device in terms of increase production costs, C_R, reduced benefits from the good of interests, B_R, and the marginal cost of administering the regulation mandating the use of the emissions device g_E.

From the perspective of cost benefit analysis, such devices should be required (e.g., E**>0) only if they increase social net benefits.

VI. Net Benefits and Time in Cost-Benefit Analysis

There are both theoretical and applied uses for the social net benefit maximization norm because this norm, if accepted, allows one to determine whether a change in public policy improves or worsens the existing situation using various combinations of economic theories and estimates of economic relationships. Normally these involve probabilistic assessments of net benefits over a significant timespan and so require the use of expected value and present values.

To illustrate the process of cost-benefit analysis, suppose that robust and unbiased estimates of external marginal costs, supply, and demand have been undertaken for the functions depicted in figure 16.3. Suppose also that the regulation to be imposed on the industry that costs F to establish and E=e(R*) per year to administer. The costs of regulation imply that the ideal output target is a bit less than the Q** of figure 6.3 as shown by equation 16.4b, which implies that Q**=Q(R*).

To determine whether regulation R* should be adopted or not requires estimates of the various costs and benefits of that regulation through time. Consumer benefits and costs can be estimated using estimates for market demand (D) and supply (S) for reasons already developed.

$$\mathrm{B(Q)} \approx \int_o^Q D^{-1}(Q)dQ, and\ C(Q) \approx \int_0^Q [S^{-1}(Q) + X(Q)]dQ$$

where $D^{-1}(Q)$ and $S^{-1}(Q)$ are the inverse functions of the demand function and supply function. The annual social net benefits realized by moving from Q* to Q** are:

$$N \approx \int_o^{Q^{**}} [D^{-1} - (S^{-1} + X)]dQ - \int_o^{Q^*} [D^{-1} - (S^{-1} + X)]dQ - e(R^*) \qquad (16.5a)$$

Which can be written as:

$$N \approx -\int_{Q^{**}}^{Q^*} [D^{-1} - (S^{-1} + X)]dQ - \mathrm{e(R^*)} \qquad (16.5b)$$

The first term corresponds roughly to the triangle labeled (5) in figure 16.3. It represents the maximal annual net benefit achieved by the regulation if it is costless, which can be denoted as N^R. The second term, the one outside the integral, characterizes the annual cost of administering the regulation.

Even an ideal policy increases social net benefits only if the present value of the costs of the regulatory apparatus—including the fixed costs of establishing the regulatory regime for implementing the policy is less than the present value of the gain achieved in moving from Q* to Q**. Recall that chapter 6 demonstrated that the present value of an essentially infinite series of benefits or costs of constant value (A) is PV(A) = A/r, where r is the annual interest rate and A is the annual amount of the cost or benefit of interest. This implies that an ideal regulation increases the present value of social net benefits only if.

$$\frac{N^R}{r} > F + e(R^*)/r \tag{16.6}$$

Whether regulation R^* increases social net benefits or not depends on the specific values for administrative costs, e(R), administrative fixed costs, F, and the annual social net benefits, N^R, that can potentially be realized via regulation. Note that if the N of equation 16.5b is greater than zero, it is the fixed costs of regulation that will determine whether R* should be adopted or not.

If the planning horizon of the regulators is finite and relatively short, or the various costs and benefits are expected to vary through time (and perhaps be stochastic rather than deterministic constants), then another of the present value formulas should be used for this calculation and expected values may have to be used to characterize some of the benefits and costs. However, the same logic applies.

VII. Social Welfare Functions, a Generalization of Bentham's Aggregate Utility Norm

> A thing is said to promote the interest, or to be for the interest, of an individual, when it tends to add to the sum total of his pleasures: or, what comes to the same thing, to diminish the sum total of his pains. …
> An action then may be said to be conformable to the principle of utility, or, for shortness sake, to utility (meaning with respect to the community at large), when the tendency it has to augment the happiness of the community is greater than any it has to diminish it. (Jeremy Bentham,(1780). *An Introduction to the Principles of Morals and Legislation,* Kindle Edition.)

In the nineteenth century, there were many utilitarian contributors to economics theory (including Bentham) and many applications of utilitarian analysis to justify particular public policies. Pigou's quantitative approach to welfare economics is essentially a fusion of neoclassical economic arguments and utilitarianism ideas. His suggestion that money values can be used to approximate degrees of satisfaction or happiness is widely accepted among economists (and many others). Thus, social net benefit calculations and modes of reasoning are widely used by applied welfare economists.

The advantage of money measures is that they are "objective" and "operational." Net benefits can be estimated using economic models and statistical methods. And, those estimates can be used to determine whether particular public policies actually increase "welfare" on average or not within the polity of interest. Given this norm, it is possible determine whether one policy is better than another or one country better organized than another.

Nonetheless, even Pigou recognized that the monetization of utility was an approximation—albeit a very useful one—of what one really wanted to maximize, namely aggregate utility—the sum of happiness in a community. Thus, a good deal of theoretical work in welfare economics use utility functions and various social welfare functions to characterize aggregate utility.

The simplest measure of aggregate utility is one mentioned several times in Bentham's work. It is simply the sum of the utility levels of all the individuals living in the community of interest, $W = \sum_i^N u_i(Q_1, Q_2, Q_3, Q_4, \ldots)$. Many other functional forms were subsequently suggested, such as multiplicative functions. In the mid twentieth century, to avoid controversies over functional form, general welfare functions such as: $W = w(U_1, U_2, U_3, U_4, \ldots U_N)$ largely replaced such concrete functional forms for aggregate utility or social welfare. The only restriction on such functions is that $W_{Ui} > 0$ for all i, which is to say that everyone in the community counts. Thus, an increase in any single person's utility, holding the others constant, adds to social welfare (W). Some scholars also require all the derivatives of W with respect to U_i to be the same, but many theorists—perhaps most—do not.

The proper aim for public policy makers is maximizing social welfare, according to proponents of the contemporary form of the utilitarian approach to policy analysis. Although few such scholars believe that real governments actively attempt to maximize a social welfare function—those employing this methodology for identifying ideal policies clearly wish that they did so.

That utilitarian approach has been used in most applied microeconomic fields to analyze the merits of alternative public policies and areas where markets and political systems may fail to realize ideal outcomes or to adopt ideal policies. There are problems with the maximize social welfare norm that will be discussed towards the end of this section, but first we'll review one of the most impactful of the applications of that approach.

Samuelson's Theory of the Optimal Provision of a Pure Public Good

Prior to 1954, neoclassical economics had regarded all goods and services to be "private goods" that were consumed one unit and one person at a time. There may be externalities, but in a sense "goods were goods" there were all essentially the same sort of divisible objects that increased utility. Such goods were, in a sense shareable, but shares fell proportionately to the number of persons sharing. If two persons equally share a candy bar, their individual consumption of the candy bar falls from 1 to one half.

Paul Samuelson (1954) suggested that not all goods have that property, and, perhaps surprisingly, that some goods are perfectly shareable. The consumption of such goods (termed pure public goods) does not decline at all as more people consume them. Examples include gravity, broadcast radio shows, broadcast television shows, national defense, and environmental quality. A few years later, Buchanan (1965) suggested that in between pure public goods and pure private goods were other types of goods that were more sharable than pure private goods although not as sharable than pure public goods. Buchanan called these good "club goods." Club goods were "congestible." The services that they provide users decrease with the number of persons using them, but not proportionately to their numbers. Examples include swimming pools, public parks, playgrounds, bicycle paths, highways, lectures, and so forth. It turns out that there is actually a spectrum of types of goods with varying different degrees of "shareability."

Although ideas about the properties of goods are obviously important for microeconomics, for the purposes of this chapter, it is Samuelson's characterization of the ideal service level of a pure public good that is of greatest interest. His argument placed a generalized social welfare or aggregate utility function at the center of his analysis.

The first step in reviewing Samuelson's analysis and conclusions is to develop his model. Let G be the level of a pure public good, let Xi be the level of a pure private good received by individual *i*, and assume that Ui = u(G, Xi) is the utility of individual *i* associated with a particular combination of the public good G and private good Xi received by *i*. In addition, we need some a social welfare function that serves as the objective function and a resource constraint. Let W be a social welfare function and let T(G,X) = 0 be the technological frontier of combinations of the public good and private goods, with the sum of the private goods being equal to their total production, $X = \sum_{i-1}^{N} X_i$. The constraint function is very abstract and is in its "zero form," T(G,X) = 0, as required for the Lagrange method. Assume that there are N persons in the society of interest.

The problem of maximizing social welfare can be undertaken with the approach developed by Lagrange, e.g., first create a Lagrange function, then differentiate with respect to the control variables and set the result equal to zero:

$$\mathrm{L} = w(U_1, U_2, U_3, U_4, \ldots U_N) - \lambda(\mathrm{T}(\mathrm{G}, \mathrm{X})) \qquad (16.7)$$

Differentiating the Lagrangian function with respect to G, X_1, X_2, X_3 .... X_N , and λ yields the first order conditions for the combination of services and private incomes that maximizing social welfare:

$$\textstyle\sum_{i=1}^{N} W_{U_i} U_{iG} - \lambda \mathrm{T}_G = 0 \qquad (16.8a)$$

$$W_{U_i} U_{iX} - \lambda \mathrm{T}_X = 0 \quad \text{for all i = 1 ... N} \qquad (16.8b)$$

(Equation 16.6b thus represents N first order equations)

$$\mathrm{T}(\mathrm{G}, \mathrm{X}) = 0 \qquad (16.9c)$$

After obtaining the Lagrangian first order conditions, the next step is to manipulate the first order conditions into a form that is both economically interesting and useful even for non-utilitarians. Samuelson uses a rather clever series of steps to do so.

First, as usual, shift the lambda terms to the right by adding their positive equivalents to each side. Then divide the first such equation by one of the members of the second group of first order conditions to eliminate the lambda.

$$[\textstyle\sum_{i=1}^{N} W_{U_i} U_{iG}] / W_{U_j} U_{jX} = \frac{\mathrm{T}_G}{\mathrm{T}_X} \qquad (16.10)$$

(I have used the j-th of the private good first order conditions to avoid confusion with "i" the counter for the summation in the public goods terms.)

Since the denominator does not change with "i" it can be brought inside the brackets, because it is essentially a constant as far as this fraction is concerned.

$$\textstyle\sum_{i=1}^{N} [W_{U_i} U_{iG} / W_{U_j} U_{jX}] = \frac{\mathrm{T}_G}{\mathrm{T}_{jX}}$$

Now note that the first order conditions for the private goods imply that the marginal social welfare generated by the private goods allocated to each individual are equal to one another at the margin:

$$W_{U_j} U_{jX} = W_{U_i} U_{iX} = \lambda \mathrm{T}_X \qquad (16.11)$$

This condition holds for all "i" and "j" (for every person's private good). This equivalence means that you can substitute each one of the $W_{U_j}U_{jX}$ with its equivalent $W_{U_i}U_{iX}$ term and rewrite the equation under part b as:

$$\sum_{i=1}^{N}[W_{U_i}U_{iG}/W_{U_i}U_{iX}] = \frac{\mathrm{T}_G}{\mathrm{T}_{jX}}$$

Note that the denominator now has a counter that moves with the sum. (This is the clever part of the derivation. The rest is pretty straight forward.)

This allows us to simplify quite a bit—the marginal social welfare weights, W_{U_i}, in the numerator and denominator are the same and can be divided out of each. This implies that:

$$\textstyle\sum_{i=1}^{N}[U_{iG}/U_{iX}] = \frac{\mathrm{T}_G}{\mathrm{T}_X} \quad \text{at } G^* \tag{16.12}$$

The ideal level of a pure public good sets the sum of the marginal rates of substitution between the private and public goods equal to the technological rate of transformation between private and public goods. (In benefit/cost terms, G* occurs at a point where the sum of the marginal benefits equals the marginal cost of the public good in terms of reductions in the private good.) **The optimal level of a pure public good is completely independent of the social welfare function used!**

Samuelson's G*--as true of other social welfare maximizing ideals—is also consistent with the Pareto criteria. The full ideal—with public good provided at level G*and private good allocated according to the system of first order conditions—is Pareto optimal. Any change would tend to reduce social welfare, which implies that any change would make at least one person worse off. (Recall that an increase in any person's utility would increase social welfare, so a reduction in social welfare must reduce someone's utility level.)

However, the distribution of the private good will vary with the specific of the social welfare function assumed. So, the complete solution cannot be fully characterized without knowing more about the social welfare function assumed and the individual utility functions.

Note also that this can be thought of as a utilitarian scholar's conclusions about the ideal production of a pure public good and distribution of private goods in a setting where the goods are more or less magically produced. However, if it is also to be considered as a policy that might be implemented in practice, there must be a political actor that can put its conclusions into place. Such an actor can be regarded as a pure "benevolent central planner" or "benevolent dictator" with complete control over the allocation of private income and over what gets produced in the society of interest. Moreover, this central planner is him or herself costless—there are no administrative costs.

Although the results looks quite general and are as far as the model goes, keep in mind that there are no labor or capital markets, nor are there taxes or governmental decision makers in this model.

Nonetheless, that the ideal output of a pure public good is conceptually independent of one's preferred social welfare function is surprising and has implications for and applications in the field of public economics.

Some Weaknesses of the Maximize Social Welfare Norm

All normative approaches can be thought of as a particular scholar's or group of scholar's methodology for thinking about ideal policies. Such scholars may hope that policy makers will take their ideas and conclusions into account when actually adopting public policies, although this is not likely to happen unless voters and political decision makers accept the normative principles behind their analyses or defer to their expertise.

In the case of utilitarian analysis that relies on social welfare functions, there are several conceptual difficulties, that the mathematics tends to hide. Perhaps, the most important is the assumption that individual utility function can be known by a theorist—not simply some of their general characteristics. Actual numerical estimates of every person's utility functions have to be worked out. Similar knowledge of the economic environment in which social welfare is to maximized is also required. For example, according to Samuelson's characterization of the ideal level of a pure public good, we do not have to argue about the form of social welfare functions if our concern is simply characterizing G*, but we would need to know the values and functional forms of U_{iG}/U_{iX} for every individual and $\frac{T_G}{T_X}$ for the economy as a whole in order to determine the ideal quantity of the pure public good of interest, G*. Ordinal utility functions are not sufficient for this. Cardinal ones (e.g., utility functions that one can be used for arithmetic, algebra, and calculus) are required.

This approach also requires that individuals truly have utility functions, rather than simply act as if they had one. This stronger assumption is not required to undertake positive analysis that assumes that individuals act as if they had such functions—because for the most part it uses such models to characterize behavior rather than utility per se. As long as individuals generally behave as if they had utility functions—as would be the case if individuals have relatively stable goals and attempt to advance them in relatively efficient ways—utility-based models will predict responses to changes in circumstances that largely will be consistent with their behavioral responses—if not perfectly so.

A third problem has to do with the lack of political context in most analyses that rely upon social welfare functions. If the results are to be more than of philosophical interest, they should in principle be ideals that a government might implement. Thus, to the extent that an important policy maker is assumed to act as if they maximized a social welfare function, that person must implicitly or explicitly be an all-powerful benevolent dictator or central planner, rather than an elected official in a democracy. In the latter case, the normative ideas used by the theorist have to be shared by at least a majority of the pivotal voters to systematically influence public policy.

Lastly, when pushed to its limits, utilitarian analysis can reach conclusions that conflict other normative theories, as with rights-based frameworks. For example, if harvesting the organs of a single person can prolong the lives of two dozen people, utilitarian analysis would tend to conclude that such policies—randomly killing healthy persons for their body parts—is a completely moral activity. A rights-based theory would argue that individual should have veto power over such actions. However, individual rights never trump the implications of maximizing aggregate utility from a utilitarian standpoint.[3] There is a fairly wide domain in which utilitarianism generates morally plausible results, but this does not include all morally relevant questions—in spite of the arguments and assertions made by utilitarians.

VIII. Contractarian Norms—a Possible Alternative to Utilitarianism

An alternative to the utilitarian approach that preserves its basic idea that "everyone counts" and tends to generate Pareto optimal outcomes is the contractarian normative theory. It is far less

[3] It should be noted that "rule-utilitarians" exist and often develop arguments that provide utilitarian defenses of some rights. Nonetheless, such lines of argument are rarely used in the utilitarian strand of welfare economics.

widely used than the utilitarian approaches by economists, but used by many economists who find some of the utilitarian assumptions and conclusions to be problematic.

Contractarian normative theory has its roots in Hobbes' (1651) and Locke's (1690) theories of legitimate governments, both of whom refer to social contracts and regard governments created by consensus to be the most legitimate forms of government. They both term such governmenets commonwealths. Governments grounded in the consent of those governed are formed to advance the shared interests of their citizens. In Hobbes' case, a commonwealth is created to escape from "the war of every man against every other."

> The final Cause, End, or Design of men, (who naturally love Liberty, and Dominion over others,) in the introduction of that restraint upon themselves, (in which we see them live in Commonwealths,) is the foresight of their own preservation, and of a more contented life thereby; that is to say, of getting themselves out from that miserable condition of War, which is necessarily consequent (as hath been Shown) to the Natural Passions of men… (Hobbes, 1651, p. 93)
> [W]hen **men agree** amongst themselves, to submit to some Man, or Assembly of men, voluntarily, on confidence to be protected by him against all others. This later, may be called a Political Commonwealth, or Commonwealth by Institution… (Hobbes, 1651, p. 96).

In the Lockean case, a commonwealth is created to reinforce the normative inhibitions against attacking or stealing from one's neighbors. His natural state is not as gloomy as that of Hobbes, but sufficiently uncomfortable that agreements to create a government or law-enforcing organization are possible. In both cases, the governments of commonwealths are grounded in the consent of the governed, rather than conquest by coercive organization able to impose laws on others.

The contractarian line of reasoning preceded utilitarian thought by a century and a half. In addition to the two scholars already mentioned, contractarian reasoning was employed, for example, by such well-known scholars as Montesquieu (1748), Rousseau (1762), and Blackstone (1765-70). And, it continues to play a role in ideas about legitimate government and the bounds of the authority of such governments today. Contractarians suggest that voluntary agreement as the best process for determining and/or ranking political and legal procedures and states of the world. Many of their conclusions differ from one another—as true of utilitarians—but all begin with ideas that resemble the notion of a Pareto superior move. A change in the status quo is "good," "proper," or legitimate, if and only if at least one person favors the change and no one opposes it. Such changes would be adopted without opposition.

The twentieth century revival of contractarian analysis was launched more or less independently by two scholars: John Rawls (1921-2002) and James Buchanan (1919-2013), both of whom were dissatisfied with various aspects of utilitarianism. Rawls' approach was similar in spirit to Locke's, and Buchanan's more closely resembled that of Hobbes—although each provided new foundations for and methods of contractarian analysis. Rawls' approach is widely regarded as one of the major innovations in philosophy in the twentieth century. Buchanan won the Nobel Prize in economics in 1986 for his contributions to constitutional theory, most of which were grounded in his contractarian approach.

Rawls (1971) argues that what might be called moral intuitions tend to converge on two principles of justice and that these are compatible with many, but not all, institutional designs:

> First: each person is to have an equal right to the most extensive basic liberty compatible with a similar liberty for others. Second: social and economic inequalities are to be arranged so that they are both (a) reasonably expected to be to everyone's advantage, and (b) attached to positions and offices open to all. (Rawls, 1971, pp. 60-61).

His analytical device for finding that consensus—the veil of ignorance—resembles Adam Smith's notion of the impartial spectator, in that it requires individuals to imagine a choice setting in which one is completely ignorant of one's place in society and to choose among societies given that he or she might conceptually wind up in any of the positions in that society. Such a perspective tends to make each person an impartial observer of an entire social order.

Buchanan (1975) develops a Hobbesian perspective on the emergence of governance, and in that book (and in many other books and papers) suggests that bargaining possibilities exist at the Nash equilibrium that emerges in a state of anarchy. These possibilities allow mutually beneficial rules to be gradually adopted. He argues that that consensus is the ultimate foundation for legitimate governance and also for subsequent changes in governance and public policy.

> In the earlier book [Buchanan and Tullock, 1962], we argued that the criterion of acceptability or efficiency lay in agreement, in unanimity. Further, we argued that insofar as participants remain uncertain as to their own specific roles in subsequent operation under the rules chosen, they would tend to reach agreement on reasonably "fair" and "efficient" working rules. We did not postulate initial equality among individuals in property rights or in capacities, but our

> presumption of uncertainty served to generate a plausible basis for agreement on rules for collective action. (Buchanan, 1975, p. 81).

Note that both Buchanan and Rawls argue that uncertainty tends to increase prospects for agreement by inducing individuals take a broader view of the benefits and costs of governing institutions and grounding laws.

However, the manner in which uncertainty tends to generate consensus differ significantly in their theories. In Rawl's analysis, the veil of ignorance requires individuals to adopt that perspective in order to determine just or fair institutions. This requires each individual to accept his reasoning about the veil of ignorance being an effective way to discern just or fair institutional arrangements.

In contrast, Buchanan—a student of Frank Knight—suggests that uncertainty is inherent in all long-term decisions about political and legal institutions, because one cannot perfectly imagine how those institutions will affect the future or, therefore, an individua's own long-term interests. One can imagine a wide range of possible outcomes for oneself under political and legal institution, which requires each individual to take a wide range of possibilities into account. For example, one could wind up rich or poor in the future under the rules agreed to, and that tends to induce each individual to favor rules that are advantageous both to rich and poor persons. Taking account of a range of such possibilities is, for Buchanan, inherent in making long term commitments about "the rules of the game" and requires no agreement, implicit or otherwise, about the relative merits of "the veil" as a method for discerning just or fair social systems.

Rawl's veil of ignorance and Buchanan's veil of uncertainty are sufficiently clear ideas that one can characterize both their analytical approaches and some of their conclusions using conventional rational choice models—as was also possible for utilitarianism after the mathematics of utility functions were worked out. Bear in mind that neither assumes that the models below are necessarily the best way to interpret their theories, but it does serve to illustrate their differences and place on a footing analogous to the utilitarian analysis developed above.

Behind the Rawlsian Veil

Rawl's notion of equal liberty in principle constrains the types of decisions that can be properly made from behind the veil of ignorance. To simplify a bit, we'll assume that both the equal liberty principle (L) and some rule, possibly a political decision rule (R) and government service (G) have effects on the future distribution of wealth and thereby utility. We'll also assume that the effects tend to vary among individuals because of differences in native talent, family, and location,

W_i=w_i(G, R, L). Each person's utility function or perceived quality of life differs for the same reasons, U_i=u_i(W_i). The rules defining equal liberty are prior to the decision behind the veil according to Rawls, and so L is held constant for deliberations behind the veil. Procedural rules and perhaps some key government services are decided from behind the veil. Let F_i characterize the probability of being a person of type i. If the typical individual is an expected utility maximizer, their choice from behind the veil would be:

$$U_i^e = \sum_{i=1}^{N} F_i u_i(w_i(G, R, L)) \tag{6.13}$$

Note that, as written, everyone maximizes the same fairness objective function, which implies that a perfect consensus would emerge among the individuals that use the Rawlsian approach. IF we assume that each utility function (after the substitution) is strictly concave, we can use our normal optimization methods to characterize the ideal level of government services and type (or system of rules) that would be adopted from behind the Rawlsian veil. Differentiating with respect to G and R yields two first-order conditions that characterize the unanimous decision that would be made from behind the Rawlsian veil.

$$U_{iG}^e = \sum_{i=1}^{N} F_i u_{iW} w_{iG} = 0 \tag{6.14a}$$

$$U_{iR}^e = \sum_{i=1}^{N} F_i u_{iW} w_{iR} = 0 \tag{6.14b}$$

Both first order conditions would be simultaneously satisfied at this Rawlsian ideal institutional arrangement. Both ideals in turn can be characterized as function of the equal liberties adopted in stage 1, G*=g(L) and R*= r(L).

Notice that if everyone adopted this expected utility version of decision making from behind the veil, each person's normative objective function turns out to be identical. In such cases, agreement from behind the veil is essentially automatic, unless personal assessments of other people's utility functions or of the W functions vary. Nonetheless, conclusion reached about the best procedures (R*) and core government services (G*) would vary with the system of equal liberties in place. Note also that equation 6.13 closely resembles a Benthamite aggregate utility function. If F_i is interpreted as the number of persons of type i in the community of interest, it would be mathematically identical to such a welfare function that maximized average utility.[4]

[4] Rawls adopts an extremely risk averse version of the objective function that maximizes the worst possible payoff rather than the average payoff. His "maxi-min" approach yields a focus on

Although, the model developed is an abstract one that considers grounding institution, the same approach could be used to characterize ideal fiscal systems, education systems, environmental programs, and demogrant programs, and so forth. What differs from the utilitarian approach is the term L, which limits the types of policies that can be adopted to those that are consistent with the equal liberty rules or rights adopted in the first round—about which Rawls is not clear.

Behind Buchanan's Veil of Uncertainty

With three modifications the model used to characterize Rawlsian reasoning can also be used to characterize the conclusions that tend to emerge from the Buchanan approach to contractarianism. In Buchanan's analysis one remains "oneself" and so the relevant uncertainty concerns one's future wealth, rather than one's identity. Also, the probability that one realized a particular wealth in situation "k" would be affected by the rules adopted. The same rules also affect the extent of one's future wealth associated with situation "k", as in the Rawlsian model. In addition, in Buchanan's analysis there is always a status quo ante. The original state (status quo ante) implies that individual have an original or pre-constitutional endowment of wealth, Wi, which may affect their anticipated future wealth and the probability of particular wealth outcomes, $F_i=f_i(G, R, L, W_i)$ and $W_i=w_i(G, R, L, W_i)$.

To simplify a bit, we'll neglect present value calculations and focus on a future steady state, and also assume that there are K possible future wealth distribution. In the choice setting described, an individual's expected utility would be:

$$U_i^e = \sum_{k=1}^{K} F_k(G, R, L, W_i^0) u_i(w_{ik}(G, R, L, W_i^0)) \quad (6.15)$$

Buchanan's approach would include equal liberties as a decision to be reached at the constitutional convention, so there are three first order conditions in this case.

$$U_{iG}^e = \sum_{k=1}^{K} F_{kG} u_i(w_{ik}(G, R, L, W_i^0) + \; F_k U_W W_G) = 0 \quad (6.16a)$$

$$U_{iR}^e = \sum_{k=1}^{K} F_{kR} u_i(w_{ik}(G, R, L, W_i^0) + \; F_k U_W W_K) = 0 \quad (6.16b)$$

$$U_{iL}^e = \sum_{k=1}^{K} F_{kL} u_i(w_{ik}(G, R, L, W_i^0) + \; F_k U_W W_L) = 0 \quad (6.16c)$$

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the worst-off person in society and tends to promote a good deal of redistribution—more so than the expected utility approach used above. Of course, if persons behind the veil differed in their degree of risk aversion, agreement from behind the veil would be unlikely to occur.

All three first order conditions are satisfied at an individual's ideal system of services, rules, and rights defining equal liberties.

Notice that a consensus is not guaranteed in Buchanan's system. This is largely because no presumption that people all initially agree about how to rank alternative outcomes is assumed and also because of differences in initial endowments, wealth functions, and utility functions. For agreement to be likely, individuals would have to be fairly similar in their utility functions (even more so than assumed to this point) and also would have to have similar expectations about how the alternative services, rules, and liberties affect personal wealth. Even in that case, the effects of uncertainty must largely swamp differences in initial endowments.

In Buchanan's defense, such commonalities are not entirely unrealistic for persons initially living in the same community, and hence there are prospects for agreement behind Buchanan's veil as well. Alternatively, rather than a perfect convergence, individual ideals for the three variables (G_i*, R_i*, L_i*) may be sufficiently close to one another, that a compromise can easily be worked out—because of the anticipated net benefits (here an increase in expected utility from reductions in uncertainty and better protection of rights relative to the pre-contractual setting).

And, as in the Rawlsian case, Buchanan's approach can also be applied to analyze the relative merits of policy changes.

Note that in contrast to the utilitarian approach, under Buchanan's approach everyone in the relevant community has to anticipate improvements in their own quality of life for a consensus to emerge. The requirement for consensus implies that it matters how any new social net benefits are distributed in the post agreement society. It is not sufficient for the winners to win more than the losers lose, as it would be under the usual utilitarian norms. If there are losers, the winners must compensate them for their losses.

IX. Some Conclusions—Economics and Normative Analysis

In chapter 15, we demonstrated that a positive analysis of the effects of various ethical dispositions on the size and scope of markets could be undertaken. In this chapter, we shifted to normative analysis. In particular, we have focused on normative ideas that have attracted the most attention from economists interested in policy reforms. Such economists attempt to assess the relative merits of alternative policies as well as their economic consequences. This area of research is often referred to as welfare economics, and that term has been used throughout the chapter as a shot hand for the various approaches that economists have employed to assess the relative merits of policies that might be adopted.

All of the mainstream approaches to judging the relative merits of policies and of market outcomes are "consequentialist." It is consequences of policy decisions that determine their relative merits, rather than the inherent goodness of particular policies themselves. To a consequentialist, good policies have good consequences. Welfare economics naturally focuses mainly on economic consequences. Much of the strand of microeconomic research uses utilitarian-based analysis to determine whether "social welfare" has increased or not—e.g. whether aggregate utility is increased by a new policy or reform of policy or not (or roughly equivalently, whether social net benefits have increased are not, or whether an outcome is Pareto efficient or not).

The correlation between income and wealth and utility allows changes in aggregate economic output or income to be used as a proxy for aggregate utility. That inference also implies that monetized calculations of benefits and costs can be used to assess whether aggregate utility tends to increase when relatively narrow policies are adopted (or repealed).

An advantage of the economic approach to normative analysis is that it is systematic. The consequences of alternative policies have to be imagined and estimated in some detail, probabilities of different possible consequences have to be approximated, and net benefits associated with each possibility assessed. Such steps are useful even if one does not use one of the welfare economic approaches to determine the relative merits of alternative policies. Although none of these steps is likely to as precise in practice as mathematical models imply, large differences in net benefits and risks can often be identified and sensible decisions reached that are likely to broadly increase net benefits within the community of interest.

Broader issues and even systemwide redesigns have also been analyzed by welfare theorists in ways that shed light on larger economic-social-political-legal system issues. Many of these address concerns beyond the main foci of microeconomics, but insofar as economic consequences are taken into account there remain within the field of economics—if often along it farthest boundaries. Careful examinations of the issues, including economic ones, can help persuade policy makers about polices that are likely to improve life for residents of their communities and also to avoid policies that tend to undermine the quality of life in their communities.

It may also help both economists and others better understand some of the broad moral issues associated with market-based societies—both their costs and their benefits.

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