

ECONOMIC RESEARCH REPORTS

WERE THE ORDINALISTS WRONG
ABOUT WELFARE ECONOMICS?

by

Robert Cooter
and
Peter Rappoport

R.R. #83-14

July 1983

**C. V. STARR CENTER
FOR APPLIED ECONOMICS**



**NEW YORK UNIVERSITY
FACULTY OF ARTS AND SCIENCE
DEPARTMENT OF ECONOMICS
WASHINGTON SQUARE
NEW YORK, N.Y. 10003**

WERE THE ORDINALISTS WRONG ABOUT WELFARE ECONOMICS?

Robert Cooter*

School of Law

University of California

Berkeley, CA 94720

Tel: (415) 642-4630

Peter Rappoport*

Department of Economics

New York University

New York, NY 10003

(212) 598-7891

*We would like to acknowledge the invaluable comments offered on earlier drafts by Sean Flaherty, Marcia Marley, Andrew Schotter, Mark Schankerman and Lloyd Ulman, and by two anonymous referees. We are grateful to the National Science Foundation for financial support. All responsibility for errors in this paper rests with the authors.

The development of utility theory has experienced two definitive episodes: the "marginalist revolution" of the 1870's and the "Hicksian" or "ordinalist revolution" of the 1930's. While the first event established a central place for utility theory in economics, the second restricted the concept of utility acceptable to economics. The term "ordinalist revolution" refers to the articulation of results in price theory that demonstrated the redundancy of cardinal notions of utility, and to the general acceptance of the position that utility was not comparable across individuals. The purpose of this paper is to analyse the events comprising the ordinalist revolution with a view to determining whether they achieved the advances in economic science usually claimed for them.

The developments of the 1930's are often regarded as unambiguous progress in economics. The intuitive idea of scientific progress is that new theories are discovered which explain more than old theories. We shall contend that the ordinalist revolution was not scientific progress in this sense. Rather than there occurring a generalisation of the older economics, as maintained by many commentators,¹ there was a dramatic change in the conceptual framework of economics. Important elements of a conceptual framework are

a definition of the subject matter to be studied, a method of investigation and proof, and some substantive empirical claims.

The older framework defined economics as the science of "material welfare"² and employed an empiricist methodology. In addition, its practitioners held that their conception of utility was comparable across people. The newer framework adopted a scarcity definition of economics, and employed a positivist methodology. The salient feature of utility was held to be its ordinal nature. This, in turn, implied that some arbitrary "convention" for combining the utilities of different people was required if interpersonal comparisons were to be justified. Thus, there was a substantial difference between the approaches of the two schools, and between the types of questions they addressed. The opponents of the material welfare school did not offer a more comprehensive account of the concerns of that school, for example, the business of alleviating poverty. Instead, the trick which carried the day for the ordinalists was to argue that the questions which the material welfare economists asked about poverty, and the answers which they gave, were meaningless.³ The ordinalists offered different questions, not better answers. Thus, the

ordinalist revolution represented a change, not progress in economics.

The focus of this paper is the use of interpersonal comparisons of utility by the material welfare school. Economists of this school are often characterized as having relied extensively on the belief that utility is cardinally measurable (unique up to a positive affine transformation), a belief which cannot be validated by examination of consumer behavior, and one that is unnecessary for deriving results in the theory of consumer demand. We do not consider in detail whether economists at the turn of the century believed individual utility to be cardinally measurable, since this issue is tangential to the question of interpersonal comparisons. Instead, we concentrate on the special assumptions concerning utility that justified the interpersonal comparisons made by these economists.

The different roles of assumptions about measurability and comparability of utility can be elucidated by borrowing from the modern framework of social welfare theory. (Cf, for example, Amartya Sen (1977)). Let each individual $i = 1, 2$ be represented by a set, L_i , of utility functions. Each utility function is defined over the set of social states, and, for the present purpose, is best regarded simply as a

set of numbers, one for each state. Measurability assumptions restrict L_i to particular classes of functions, or equivalently, particular sets of numbers. For example, if utility is cardinally (ordinally) measurable, then each L_i will contain functions or sets of numbers that are related to each other by positive linear (monotone) transformations.

In order to compare the utilities of the individuals, it is necessary to select a utility function from each L_i , or, equivalently, an element of L , the Cartesian product of L_1 and L_2 . This choice determines the magnitude of the numbers that will represent each person's utility in comparisons. In the absence of arguments for its superiority over others, the choice of utility functions is arbitrary. However, it is crucial, since, in general, the outcomes of interpersonal comparisons will depend on it. Hence, it may be called a "comparability value judgement." Indeed, as long as the L_i , and equivalently L , are not singletons, in general there will be comparability value judgements from which it will follow that person 1 derives more utility than 2 in a particular state, and judgements that entail the reverse.⁴ In particular, even if individual utility is cardinally measurable, it can be seen

that L has not been restricted sufficiently to make the judgement non-trivial. For example, there will be an element in L in which the state that yields 1 lowest utility has a larger number attached to it than 2's highest utility state, and an element of L in which the reverse occurs. In addition, one is not prevented from making comparability value judgements when utility is ordinally measurable. Thus, it can be seen that the standard measurability restriction do not have any material effect on the arbitrariness of interpersonal utility comparisons. The arbitrariness can only be removed by appeal to some external standard.

As we shall see, the material welfare school did opt for a particular comparability value judgement, and evaluated social welfare on the basis of it. The ordinalist school decided to remain agnostic on the issue of whether any particular assignment of utility functions to individuals takes precedence over others. However, the story does not stop there. The material welfare school was careful to define the concept of utility in such a way that a particular value judgement commended itself as being defensible. Utility rankings were not seen as coextensive with preference orderings, nor were they derived from them.

Essentially, goods were seen as having utility if they contributed to a person's physical well-being, which was often conceived of as equivalent to productive capacity. Hence, individuals with the same physical characteristics were viewed as having the same utility function. When ordinalist writers criticised this selection of utility functions, they attributed to the material welfare school their own conception of utility, and essentially pointed out that, under these circumstances, the material welfare school's comparability value judgement could not be defended within the confines of positive economics, and hence was normative.

The body of this paper examines the conceptual frameworks of the two schools, and argues that the different conceptions of utility held by each justified different statements concerning comparability. The substantial difference between these two frameworks is offered as evidence against the view that the ordinalist revolution may be explained as part of the progress of economic science. The first section summarizes general developments in utility theory up until the early twentieth century. The next section describes the conceptual framework of the material welfare school. Following this, a comparison is made with

the ordinalist school, which reveals that the two schools were using the common elements in their vocabularies to refer to different things. The final sections of the paper summarize the argument, and suggest lines along which to explain the success of the ordinalist view.

The aim of this paper is to demonstrate that the arguments developed some fifty years ago to criticise the material welfare school do not in fact address the claims of that school, whose scientific integrity remains intact. This suggests that it may be fruitful to draw on the material welfare perspective in the analysis of present day welfare problems, and perhaps warrants a comparison with the achievements of modern welfare economics. However, we stress that these issues are not pursued in the current research, which limits itself to recounting the development of doctrine. Consequently, we have concentrated only on the welfare problems stressed by the material welfare school, and contrast its work only with early ordinalist welfare economics.

I. Utility Before the 1920's: Thumbnail History

Contemporary economics offers a separate account of consumer and producer theory, then combines them together in an analysis of markets. The classical economic theories of Adam Smith, David Ricardo, and John Stuart Mill lacked a systematic account of consumer theory. Mill wrote:

Political Economy . . . has nothing to do with the consumption of wealth, further than as the consideration of it is inseparable from that of production, or from that of distribution. We do not know of any laws of the consumption of wealth as the subject of a distinct science: they can be no other than the laws of human enjoyment. (1844)

Mill did not develop "laws of human enjoyment" to explain how consumers allocate expenditures among different commodities. He was a utilitarian who did not make utility maximization by consumers into an important element of economic theory.

One reason why utility theory was not of great significance to economics in the first three quarters of the nineteenth century is explained by the "paradox of value."

Since water had a high use-value but a low price, and the reverse held for diamonds, utility apparently was not the cause of price. With this dismissal, English economists concentrated on cost of production as the explanation of price.⁵

In England this situation persisted until W. Stanley Jevons (1871) demonstrated that the paradox of value could be resolved by associating price with the "final degree of utility," or marginal utility, rather than total utility. Using techniques of calculus, Jevons showed that equilibrium in exchange requires everyone to consume commodities in quantities such that the ratio of marginal utilities equals the price ratio for each pair of commodities.

This demonstration that mathematics could be used to fuse the theory of markets and the theory of utility convinced Jevons that it was wrong to separate them. He spoke out boldly on this matter: "Utility is plainly the subject-matter of economics from beginning to end" because "the object of Economics is to maximise happiness by purchasing pleasure, as it were, at the lowest cost of pain." (1905 p. 6 and [1870], 1911, p. 23) Jevons' contemporaries did not share his opinion of the significance of his discoveries, and although he did not die in obscurity, he did not receive the recognition that later

generations have accorded him.⁶ Nevertheless, research did continue in the same vein as Jevons', and by the turn of the century much progress had been made in the theory of price by economists of a mathematical bent, although few of them were in England.⁷

Vilfredo Pareto (1896, 1907) articulated a theory of markets based upon constrained optimization, and successfully integrated production into the marginal framework. This approach gave consumer demand equal standing relative to producer costs in determining prices, which contradicted the older tradition of economic thinking. For example, the marginalist theory denies that prices are proportional to the labor time needed for production, except in very restrictive circumstances. The cost-of-production theory of value was replaced by a theory of simultaneous determination of prices by consumers and producers.

The marginalists accomplished more than injecting consumer theory into the core of economics. From the standpoint of the history of ideas, they brought Newton's mathematics and Bentham's utilitarianism into intimate association with economic theory. The assimilation of Newtonian mechanics, which began in the 1870's and was completed in the 1940's was decisive in establishing the mathematical character of economics. The assimilation of

utilitarianism was decisive in policy science, because utilitarianism suggests ways to evaluate economic policies according to how efficiently they satisfy the wants and needs of individuals.

Measurability and Comparability of Utility

A question faced by the marginalists was whether their conception of utility was really the same as the concept which Jeremy Bentham had made prominent in political philosophy and ethics (see Bentham [1776] 1948). According to Bentham, under ideal conditions, utility can be treated as an observable quantity of pleasure with the same measurable properties as weight.⁸ The utility of one person could be observed and added to another's if it were necessary to arrive at the total utility for society.

Among nineteenth century economists, opinion varied on the measurability of utility. Francis Y. Edgeworth proposed to measure utility in terms of the "just-noticeable differences" in pleasure experienced by an individual confronted with a series of choices. (1881, pp. 7-9, 60) By equating the just-noticeable difference in utility across people, Edgeworth proposed to carry out the utilitarian calculus.⁹ In contrast, Jevons wondered whether it was possible to observe and compare individual utilities:

The reader will find, again, that there is never in any single instance, an attempt made to compare the amount of feeling in one mind with that in another. I see no means by which such comparison can be accomplished. The susceptibility of one mind may, for what we know, be a thousand times greater than that of another. But, provided that the susceptibility was different in a like ratio in all directions, we should never be able to discover the difference. Every mind is thus inscrutable to every other mind, and no common denominator of feelings seem to be possible. ([1871], 1911, p. 14)¹⁰

When Jevons derived the conditions for equilibrium in exchange, he recognized that it was not necessary to add together the utilities of different people. Pareto and Fisher (1892) developed Jevons' observation mathematically by analyzing how much must be known about utility functions in order to compute a market equilibrium. Fisher summed up this information:

Thus if we seek only the causation of the objective facts of prices and commodity distribution four

attributes of utility as a quantity are entirely unessential, (1) that one man's utility can be compared to another's, (2) that for the same individual the marginal utilities at one consumption-combination can be compared with those at another, or at one time with another, (3) even if they could, total utility and gain might not be integratable, (4) even if they were there would be no need of determining the constants of integration. ([1892], 1965, p. 89).

By 1900, therefore, there was no reason for anybody who was numerate to suppose that anything more than ordinal utility was required for price theory.¹¹

Insights such as Fisher's are cited as reasons why concepts such as marginal utility were expelled from scientific economics. However, the ordinalist revolution occurred some forty years after publication of Fisher's book in 1892. Fisher and other pioneers of utility theory persisted in using utility concepts that went beyond ordinality in their published work. In the late 1920's Fisher was still trying to measure marginal utility.¹²

Why was the ordinalist revolution delayed so long after all the necessary discoveries were made? The answer lies in recognizing that price theory was not so central to

economics until after the ordinalist revolution. Although concepts such as measurability and comparability of individuals' utility functions were known to be superfluous to price theory, they were not at the time superfluous to economics.¹³ Economists retained a keen interest in the problems of producing and distributing necessities to alleviate want, which was the condition of principally physical deficiency that arose from poverty. For these purposes, it was desirable to have a conception of utility that was comparable across people.

II. The Material Welfare School

There were several schools of thought among economists, but by the 1920's the material welfare approach was followed by prominent academics constituting the mainstream of English economics.¹³ This section will document this claim and at the same time extract from the classics the characteristics which define the material welfare school.

The conceptual framework offered by the material welfare school can be contrasted with contemporary ordinalism in terms of three central elements: the definition of economics, the conception of economic method, and substantive empirical claims about utility. The older definition of the subject focused upon material welfare, whereas the contemporary approach emphasizes scarcity. The older conception of method was called empiricism, whereas the contemporary method is positivism. Finally, the two approaches differ on the nature of the utility concept relevant for the analysis of economic behavior. We shall analyze each of these elements in turn.

Material Welfare Definition of Economics

The exposition of the conceptual framework of the material welfare school will refer mainly to Marshall, Cannan, and Pigou. In the 1920's Pigou's Economics of

Welfare was used in teaching at Cambridge and Cannan's Wealth was the principal text for the "Elements of Economics" course taught at the London School of Economics (cf. London School of Economics, 1920-1940). Marshall's Principles of Economics had entered the intellectual culture as a classic and was still widely read.

As represented in these texts, economics confined itself to a part of the well being of the community, to which Cannan referred as "material welfare", ([1914], 1928, Ch I) and Pigou as "economic welfare." ([1920], 1932, Ch I) The material welfare school made a distinction among the types of satisfactions that could be derived from goods. Indeed, goods, the motives for acquiring them and the satisfactions yielded by their consumption were arranged in a hierarchy that proceeded from the "purely economic" or "material" at one end to the purely non-economic or non-material at the other. It was stressed that there was no hard-and-fast line separating the economic part of the scale from the non-economic, although the extremes were clearly distinguishable.¹⁵ The material end of the hierarchy was concerned with survival and health. The goods that fell most securely within the purview of material welfare economics were food, "clothing, house-room and firing," followed by rest. These were dubbed "necessaries"

by Marshall. As one proceeded further along the hierarchy, one came to "comforts" and "luxuries", whose material content was less certain (Marshall, [1890], 1920, p. 6).

According to Pigou, a reason for confining attention to the material or economic end of the scale was that it permitted exploitation of the form of measurement that was available to economists, the "measuring rod of money." Given the information that a person had income of a certain money value, under certain conditions, it could be inferred that they would enjoy material welfare of a level that could be purchased by that income.¹⁶ However, it was far more difficult to establish a connection between increases in income and the other parts of welfare. Pigou cited several authors who testified to the deleterious spiritual effects of advances that had brought greater productivity and material wealth ([1920], 1932, pp. 12-14). After considering these arguments, Pigou concluded that it was likely that material and total welfare would be positively related (p. 20).

To make statements about the effects of policies on material welfare, at the aggregate level, a measure was required. Pigou proposed a partial ordering based upon the size and distribution of the "national dividend" or national

product.¹⁷ On the assumption that the rich had satisfied all their material wants, a redistribution in favour of the poor would permit more material wants to be satisfied. Thus, material welfare was said to increase if the distribution of the dividend shifted in favour of the poor, without decreasing its total ([1920], 1932, p. 89). In addition, an increase in the dividend increased material welfare if the share accruing to the poor did not fall. This measure is only partial because nothing can be inferred in the dividend with a decrease in the poor's share, or a decrease in the dividend with an increase in the poor's share.

Evidently, increases in material welfare brought about by redistribution would occur at the expense of the non-material welfare of the disappropriated. However, consideration of long-term effects somewhat mitigated this difficulty; it was held that many types of redistribution would actually increase the dividend in the long run. This result followed from the direct relationship between the extent to which an individual's material needs had been satisfied, and his or her productive efficiency. Thus, in modern terminology, there were redistribution measures for which there was no "equity - efficiency trade-off"; instead,

the two were viewed as complementary. Pigou argued that the poverty of a significant proportion of the population, especially children, indicated an untapped resource, investment in which would pay more in terms of increases in the dividend than further investment in machines. The investments expected to yield the highest return were those in school meals, health care, and industrial training ([1920], 1932 Pt IV, Ch XII). Substantive predictions of this kind constituted the central policy conclusions of the material welfare school.

Discussion of policies was carried out by considering the effects on incentives, as it was possible that, if the work effort of rich or poor were impaired, the eventual result on the dividend could be negative. Material welfare economists were thus most confident when defending egalitarian policies on grounds of efficiency. A more tentative approach was required when policies involved an equity-efficiency tradeoff. Pigou rejected rationing and wage subsidies as impairing incentives to work. Payments in kind showed much more promise, as they were considered less likely to have an adverse effect on effort than money transfers. As far as revenue is concerned, death duties

were favored by Pigou over income taxes, in order to avoid adverse effects upon savings (Pt IV, Ch IX).

While the proximate reason for relieving poverty was its detrimental effect on industrial efficiency, the recommendations of the material welfare school were reinforced by a more grandiose master plan. The goal was to liberate the race from the wants of "the brute and the savage",¹⁸ in order to permit people to develop their "higher faculties".¹⁹ These were of a more spiritual nature than material wants. Marshall argued firmly against religious views that insisted these virtues could be cultivated even in the presence of material privation. ([1890], 1920, p. 2)

In summary, this school of thought was concerned with deriving economic conditions that would bring about improvements in material welfare. Economists could discuss necessities with assurance but encountered increasing difficulties in the consideration of comforts and luxuries. The difficulties did not arise in the explanation of prices - for the material welfare school, the price of bread had the same explanation as the price of opera tickets. The problems arose in the attempt to establish firm conclusions about the practical effects of policy. It was easier to

argue that free school lunches and industrial training would increase the dividend than to argue that subsidized opera would have that effect.

The Material Welfare Conception of Utility

(a) Utility and Ophelimity

Economists of the material welfare school tended to use the concept of material welfare for analysis at the aggregate or "national" level. The term "utility" was reserved for discussion at the level of the individual. If one substitutes "utility" for "welfare" in the above discussion, it appears that an interpersonal comparison is present in one of Pigou's criteria for the establishment of increases in material welfare. This is the condition that material welfare can increase if there is a shift in the distribution of the national dividend, but no decrease in its size. The grounds for this comparison seem arbitrary, and this would lead one to believe that the work of the material welfare school was normative. Indeed, it is in this manner that they have been represented by modern historians of thought and ordinalist writers. However, this view comes from thinking in terms of the subjective notion of utility that is current today. In fact, at the turn of the century the definition of utility was not so clear-cut,

and there coexisted two distinct ideas. This was recognized implicitly by many ordinalist pioneers, and was explicitly treated by Pareto.²⁰

In his Cours d'Economie Politique (1896), Pareto noted that economists had traditionally understood "utility" in the everyday sense of "usefulness". Thus, to economists, something had utility if it was "conducive to the development and prosperity of an individual, a people, or the human race". (Pareto, 1896, p. 3) In his discussion of equilibrium, Jevons had employed the term in a different sense, which Pareto understood as the capacity to satisfy the desires of an individual, "whether legitimate or not", (1896, p. 3). Pareto coined the term "ophelimity" to refer to this type of utility, which he regarded as "subjective" (1896, 1906, passim). The difference between utility and ophelimity is thus the difference between "socially useful" and "desired". At the level of the individual "socially useful" is construed as being conducive to physical health. To illustrate the contrast, Pareto suggested that bad-tasting medicine has utility for sick children, but not ophelimity.²¹

In Pareto's view, the science of ophelimity had proceeded to an advanced state. In contrast, the study of utility was problematic. The usefulness of things was a

sticky issue: Pareto listed air, water, light and wheat as among the things that were undoubtedly useful, but he was ambivalent about potatoes, as excessive reliance on them had caused great problems in Ireland. Difficult as these questions were, Pareto believed that the progress of the social sciences depended on their resolution. Furthermore, unequivocal answers to questions of usefulness could be given if a criterion for "economic utility" were adopted, and Pareto proposed to take this as "material well-being".²²

When economists of the material school thought about interpersonal comparisons of utility, they thought in terms of comparing the material well-being of people. Physical objects were considered useful in so far as they could satisfy material needs, and the power of commodities to satisfy material needs was called utility. They believed that the needs of individuals could be compared. The comparison of needs, not the comparison of subjective desires, was what they usually meant by comparing utilities of different people. Thus their conception of utility was similar to the old idea of use-value and dissimilar to ophelimity.²³

It is worthwhile to dwell on the difference between

focussing on needs and focussing on desires, since this underlines the crucial differences, for our purposes, between utility and ophelimity. The noun "need" is synonymous with "deficiency", as measured against a norm of "completeness." For the material welfare school, this norm was the condition of the physically fit individual. The significance of such a norm is that the important deviations from it (those relating to "industrial efficiency") are physical in nature, and hence observable. One can thus dispute meaningfully with someone as to whether they or others have a need: departures from industrial efficiency may be documented by pointing to inadequacy of diets, frequency of illness, high mortality rates and so on.²⁴ In contrast, there is no corresponding evidence that one may bring to bear in a dispute with someone who maintains that he or she has a desire for something. One way to express this distinction is to say that whereas desires are voluntary (i.e., coming from the "will"), the expression of needs is involuntary. Thus, an important implication of confining utility to the material end of the hierarchy of goods or satisfactions, is that it made the production of utility observable and verifiable. On the other hand, the generation of ophelimity for a particular individual is not answerable to any standard of

verification external to that individual.

(b) Maximization of utility vs. maximization of ophelimity

For the material welfare school, the coincidence or divergence of the pursuits of ophelimity and utility assumed great importance for policymaking.²⁵ The issue arose in the debate about whether money transfers would yield the same results as payments in kind. If the poor desire what is useful, then they will spend extra money to increase utility, i.e., transfers will be spent on food, clothing, industrial training and the like. If the poor do not desire what is useful, then instead of being spent so as to maximize utility, money transfers would be squandered, i.e., spent as to maximize ophelimity.

This problem caused some consternation for the material welfare school. On the one hand, Pigou maintained that "to charge the whole body of the poorer classes with ignorance and lack of capacity for management would, indeed, be to utter a gross libel". ([1920], 1932, p. 754) On the other hand, he bemoaned the limitations of the wisdom of the typical household in its purchases and use of goods, likening it to technologically primitive cottage production of textiles ([1920], 1932, p. 754).²⁶ Considerable care had to be exercised in the practice of doling out subsidies to people who had been at or below the margin of subsistence:

For, if anybody accustomed to a given standard of living suddenly finds his income enlarged, he is apt to dissipate the extra income in forms of exciting pleasure, which, when their indirect, as well as their direct, effects are taken into account, may even lead to a positive loss of satisfaction. ([1920], 1932, p. 91)

In view of this, Pigou advocated that any redistribution of income be carried out gradually and imperceptibly.

Despite such caveats, Pigou and Marshall believed that the poor would tend to use additional money in the most useful ways. This outcome could be expected because the desire to spend on necessities is prompted by the want of them:

For we may fairly expect that most material commodities, and especially those of wide consumption, that are required, as articles of food and clothing are, for direct personal use, will be wanted as means to pleasure, and will consequently be desired with varying intensity in proportion to the pleasure they are expected to yield. (Pigou, 1903, p. 68)

It could therefore be assumed, in discussions of the disparities of material welfare, that the effect of transfers of money would be quite similar to the effect of transfers in kind.

If people typically desire what they need, and if needs are more urgent when people are poor, it follows that additional income is more useful to the poor than the rich. The marginal utility of income declines because additional income is devoted to needs whose urgency diminishes as a person's income increases. For example, Pigou wrote:

It is evident that any transference of income from a relatively rich man to a relatively poor man of similar temperament, since it enables more intense wants to be satisfied at the expense of less intense wants, must increase the aggregate sum of satisfaction. The old "law of diminishing utility" thus leads securely to the proposition: Any cause which increases the absolute share of real income in the hands of the poor, provided that it does not lead to a contraction in the size of the national dividend from any point of view, will in general, increase economic welfare. ([1920], 1932, p. 89)²⁷

Given the material welfare conception of utility, it is possible to understand Pigou's welfare criterion in terms of the condition that money be allocated so that its marginal utility is equal between people. This scheme will produce the greatest material welfare, (and the greatest improvement in productive efficiency) given the available resources. It will lead to an equal distribution of wealth only if the relationship between individual wealth and the production of utility is the same for each individual. The fact that utility was confined to the material end of the hierarchy of wants thus suggests the possibility of an egalitarian bias.²⁸ However, this was tempered in Pigou's writing by consideration of the deleterious effects on incentive and thus ultimately on the dividend, that an egalitarian policy might create. ([1920], 1932, Part IV, Chs. VIII - X, XII).²⁹

(c) The use of interpersonal averages

Material welfare economists were most comfortable in making comparisons of utility, not between specific persons, but between broad classes of people who differ widely in their unmet needs--e.g. the rich and the poor. The terms "the rich" and "the poor" were used to describe averages, not individuals, much as modern theorists talk about "the consumer." Comparisons between two named individuals were declared impossible or infeasible. However, this was not

considered to be of particular importance for policy.

Thus, Marshall argued:

It would therefore not be safe to say that any two men with the same income derive equal benefit from its use; or that they would suffer equal pain from the same diminution of it... Nevertheless, if we take averages sufficiently broad to cause the personal peculiarities of individuals to counterbalance one another, the money which people of equal incomes will give to obtain a benefit or avoid an injury is a good measure of the benefit or injury. If there are a thousand persons living in Sheffield, and another thousand in Leeds, each with about L100 a-year, and a tax of L1 is levied on all of them, we may be sure that the loss of pleasure or other injury which the tax will cause in Sheffield is of about equal importance with that which it will cause in Leeds. ([1890], 1920, pp. 18-19).

Indeed, it was scarcely to be expected that one would be able to make any sense of individual comparisons. In his

attempts to measure the marginal utility of money, Fisher resorted to the device of the average family. His justification in modern usage, was that individual data contains "too much noise." (1927, p. 181). The claim that poor people have more urgent needs than rich people was thus made with similar caveats as the claim that the consumer allocates a smaller share of his or her budget to housing as income rises. Both propositions smooth out the statistical outliers.

That material welfare economists, as we have described them above, had no difficulty with this use of averaging is scarcely surprising.³⁰ Their view that utility sprang from conditions associated with physical survival led them naturally to believe that people were fundamentally alike except for an insignificant personal component, rather than that the personal component swamped the shared one.

The ability to make interpersonal comparisons of utility is already implicit in the hierarchical conception of human needs. The significance of the hierarchy is that it arranges needs in the order in which they unfold as income increases. This order is the same for different people, in particular it is shared by the average rich person and the average poor person. In order to compare the welfare of two different people it is necessary to locate

their positions on the hierarchy. The higher person on the hierarchy enjoys a greater level of welfare. For example, a person deprived of food has a more urgent need than a person deprived of entertainment. Giving food to the hungry increases material welfare more than giving theater tickets to the bored. However, material welfare economists did not claim any jurisdiction over the "higher faculties", as Marshall called them. They did not pretend to know whether one person was more capable of enjoying the theater than another. All they said about these commodities was that, in comparison to food their contribution to material welfare was not significant.

The "Scope and Method" of Material Welfare Economics

Material welfare economists' held that social reform is an important motive for studying economics.³¹ However, they were particularly conscious of the distinction between positive and normative economics, and of the necessity of abstaining from prescription. Thus, Pigou contended that economics "will not...be an art, or directly enunciate precepts of government. It is a positive science of what is and what tends to be, not a normative science of what ought to be." ([1920], 1932, p. 5) According to Schumpeter and Dennis H. Robertson, the methodological bible of the time

was J.N. Keynes' Scope and Method of Political Economy.³² Here, three aspects of political economy were distinguished: the economy were distinguished: the studies of "economic uniformities, economic ideals and economic precepts." The first were seen as the subject of positive enquiry, the second as the concern of a "normative science" and the last as the province of an "art": "a system of rules for the attainment of a given end" (p. 35). Keynes insisted that it was both possible and desirable to restrict economics to the positive study of economic uniformities (Ch. 2. iii). Similar views are advanced in Marshall's Inaugural Lecture at Cambridge (cf. Marshall [1885 p. 38]). The pronouncements of the material welfare school on the scope of economics are thus in keeping with those at the base of modern economics.

The material welfare economists saw themselves in a long tradition of empiricism. British empiricism was characterized in theory by the claim that knowledge comes from experience, rather than reason, and in practice by meticulous attention to detail and the collection of facts. The material welfare economists, like other empiricists, took pride in being sober scientists whose theories were grounded in facts. They took pains to collect and analyze

data on wealth and welfare,³³ and they were pioneers in mathematical economics and statistics. They aspired to the same high standards of proof as present day economists, but had a different idea of what to do when that standard was unattainable.

If quantitative evidence was insufficient to decide an issue then the material welfare school accepted common sense and introspection as legitimate evidence. Thus, Marshall observed that "as human nature is constituted, man rapidly degenerates unless he has some hard work to do." ([1890], 1920, p. 136) Similarly, Frank Taussig appealed to the fact that "all human enjoyments tend to pall rapidly when repeated," in his discussion of the law of diminishing marginal utility. ([1901], 1946, Ch. 9) Such passages are the remnants of the prose style of the 19th century British classics, which modern economists can find embarrassing, like a photograph from adolescence.

In fact the appeal to common sense was part of a carefully considered method formulated by J.S. Mill (1844). According to Mill, all knowledge is obtained inductively from experience, and the scientific ideal involves performing an exact experiment whose outcome is decisive among rival theories. However, in economics it is never possible to perform the experimentum crucis, e.g., the Bank of

England will not alter its policies merely to test economic theories. The absence of experimental data can be overcome partly by statistical methods, but in the end Mill thought it was necessary to draw upon ordinary experience and common sense. According to Mill, abstract economic theory proceeded by deduction from common sense generalizations.

Appeals to common sense by the material welfare school can be distinguished into two kinds. First, there were judgements about relative need, e.g., satisfying hunger is more urgent than alleviating boredom. Second, there were appeals to introspection, e.g., that a poor person gets more pleasure from what he or she buys with an additional dollar than a rich person. As noted earlier, the material welfare school would have been well advised to be more scrupulous about Pareto's distinction between needs and desires.

In retrospect, the use of statistics by the material welfare school was the harbinger of the future, and appeal to everyday experience was a vestige of the past. Contemporary economists think of their method as positivist and behaviorist. The positivist approach shuns arguments from common sense which lack the rigor of quantitative evidence. The behaviorist approach scorns introspection as having no place in science. In Part III we shall develop a

more detailed account of positivism and behaviorism, which will facilitate the contrast with empiricism.

From our exposition in Part II it is clear that the elements of the conceptual framework of the material welfare school were closely bound together. The material welfare definition of economics committed the subject to the analysis of economic needs. The arrangement of needs in a hierarchy was motivated by common sense, as well as by scientific evidence. The methodology of empiricism admitted common sense into social science. These foundations motivated the conception of utility as an objective, public phenomenon, comparable across individuals. Critics of this conceptual framework were more likely to succeed if they could offer a complete alternative, which is exactly what Lionel Robbins did.

III. The Critique of the Material Welfare School

The tradition exemplified by Cannan, Pigou, and Marshall was attacked by Robbins in his Essay on the Nature and Significance of Economic Science, first published in 1932. The parts of this critique which generated the most controversy were the first and last chapters, which dealt with "The Subject Matter of Economics" and "The Significance of Economic Science," respectively. Our development of the arguments of these chapters will correspond to the discussion above of the material welfare school, dealing with Robbins' definition of economics, and his conceptions of method and utility.

Scarcity Definition

In the first chapter Robbins criticised the material welfare definition of economics on the grounds that it did not comprehend the full range of topics which economists study. For example, wheat is more material than opera, but the demand for opera tickets is as fit for study by economists as the demand for wheat. He proposed an alternative definition:

Economics is the science which studies
human behavior as a relationship between
ends and scarce means which have alternative

uses. ([1932], 1937, p. 16)

Only this definition possessed the "capacity to describe exactly the ultimate subject-matter of the main generalization of the science," (pp. 4-5) according to Robbins. He called this definition "analytical", rather than merely "classificatory," because it "focuses attention on a particular aspect of behavior, the form imposed by the influence of scarcity." (p. 17)³⁴

The crucial feature of Robbins' definition is that it expands the list of goods that are the legitimate concern of the economist. Under the material welfare definition, economics was particularly concerned with goods which people need for the sake of physical well-being. Under Robbins' definition, one good is as appropriate for study by economists as another so long as someone does not have as much of it as he or she desires. Bread and opera are on an equal footing in scarcity economics, whereas they occupy different positions in the hierarchy of needs.

Robbins stated that "what is rejected is but a definition," and not "the body of knowledge which it was intended to describe." (p.22). However, it is important to realise that change of definition was instrumental in uprooting the existing body of knowledge. For if, the "unity of the subject of Economic Science" were to come from

"the forms assumed by human behavior in disposing of scarce means" ([1932], 1937, p. 15), then the natural primitive concept for studying human behaviour would be ophelimity rather than utility. Robbins did not make this distinction, and continued to use the term "utility" in his analysis of the work of the material welfare school.

As we have noted, ophelimity cannot be observed, and there is no reason to believe that it will be the same for two "average" individuals confronted with the same objective circumstances. Therefore, Robbins would find that his conception of utility offered no scientific support for statements about the effects on welfare of redistributive measures. This argument was couched in terms of Robbins' conception of science, as we shall now explain.

Positivism

During the 1930's, economists at the London School of Economics, where Robbins taught, were exposed to the philosophy of logical positivism,³⁵ which was imported into England from Vienna. (W.H. Beveridge, 1960, Ch. 4) Positivism had a dramatic impact upon Anglo-American philosophy and social science.

Positivism shared many of the predilections of empiricism, e.g., both held that knowledge comes from experience rather than reason, both advocated testing theories by quantitative methods, and both held that prescriptions and policy judgments are outside of science. However, these traditional tenets of empiricism were given a much narrower interpretation by the positivists. This change in tone had a large effect upon the practice of social science.

At this stage of the paper, we can focus upon one aspect of positivism, namely its strictures against mental and moral concepts. A basic claim of positivism is that science can be demarcated from nonscience according to whether or not the propositions in question predict observable events.³⁶ Positivists tended to interpret "observable events" in a very restrictive sense. Concepts with an ethical tinge (duties, obligations, values, norms, etc.) were deemed "unobservable." For example, it is said that the existence of a duty to tell the truth cannot be confirmed by observation and is therefore regarded as metaphysical, and outside the pale of science. Those concepts with a subjective tinge (intentions, wishes, purposes, pleasures, happiness, etc.) were suspect. For

example, another person's pleasure cannot be observed so directly as chairs or horses. Some positivists went so far as declaring all subjective and mentalistic concepts to be unobservable, and became behaviorists in their approach to science.

Robbins went a long way in the positivist direction of excluding ethical and mental concepts from science. The material welfare school had long recognized that neither cardinal utility, nor interpersonal comparability of utility are necessary to explain market behavior. Robbins claimed that no observable behaviour could be explained by placing such structure on utility. Since observability is the demarcation criterion for science, he concluded that interpersonal comparisons of utility are outside science. In order to understand this claim we must appreciate Robbins' conception of utility.

Ordinal Utility

The claim that interpersonal comparisons of utility are outside of science may seem bizarre in light of the careful research by the material welfare school into the consequences of material deprivation. Hunger is plainly observable, open sewers assault the senses, the relationship between infant mortality and prenatal care is documented,

etc. For the material welfare school, "utility" referred to the extent to which material needs were satisfied, which is observable. What did Robbins mean by claiming that utility is unobservable?

We noted that the material welfare school adopted an objective definition of utility (socially useful), whereas the ordinalists adopted a subjective definition (satisfaction of desire). As noted, Jevons used the subjective definition and remarked that there is no compelling way to compare the pleasures of different people. Robbins merely embedded this familiar claim in positivist philosophy. Specifically, he regarded utility as relating to preferences (i.e., ophelimity) and he stressed that alleged comparisons of utility across persons cannot meet the criterion of observability which demarcates science from non-science (Robbins, [1932], 1937, pp. 136-142).

Robbins' commitment to the positivist line is exemplified by his treatment of the law of diminishing marginal utility in the last chapter of his Essay. Here he offered a discussion of the assumptions underlying the "theory of public finance," especially progressive income taxation. The defense of progressive taxation by Robbins' opponents proceeds from the assumption that the marginal utility of income declines to the conclusion that total

utility will be increased by the transfer of a pound of income from the rich to the poor.

Robbins condemned this argument as "merely specious," representing "an extension of the conception of diminishing marginal utility into a field in which it is entirely illegitimate." The unextended, legitimate law refers only to the income and utility of one individual; to extend it "begs the great metaphysical question of the scientific comparability of different individual experiences." ([1932], 1937, p. 137. Cf. also Benham (1930))

Two sources of evidence are recognized in Robbins' Essay: introspection and observation. He reported that he could find no introspective evidence in favor of the extended law of diminishing marginal utility of income. He also asserted that observation had no bearing on this extension, because no one can observe the satisfaction enjoyed by other people. We may, by chance, agree on which satisfaction is greater, but if we disagree, then there would be no way to resolve the dispute. He concluded that the extended law of diminishing marginal utility

...cannot be justified by appeal to any kind of positive science. It involves an element of conventional valuation. Hence it is essentially normative, ([1932], 1937, p. 139).

Economists were thus presented with a dilemma: either they adopted a convention which made interpersonal comparisons possible, or they abandoned comparisons altogether. If they took the former course, then, according to Robbins, they would have to eschew the pursuit of positive science. On the other hand, were they to dedicate themselves to positive science, there would needs be a "substantial curtailment of much of what [now] assumes the status of scientific generalization in [current] discussions of applied economics." ([1932], 1937, p. 141).

As noted, the material welfare school thought that propositions about needs and their satisfaction concern observable facts, not ethical judgments. Of course, "needs" has an ethical tinge and "satisfaction" sounds mental, which arouses the suspicion of positivists. Robbins proposed to purge utility of its ethical tinge, but he did not propose to eliminate its subjective tinge. In his day there was a tendency to describe utility as a psychological impulse or mental spring to action. He did not object to such descriptions, but he insisted that subjective impulses were not measureable or comparable across persons. The possibility of a strictly behaviourist interpretation of utility was not part of the vision of his Essay.

In 1934, John Hicks and R.G.D. Allen offered "A

Reconsideration of the Theory of Value", which supplied the technical basis for a behaviourist account of consumer theory. Their article reconstructed consumer theory by isolating and developing those parts which did not rely on cardinality. Two notable casualties were the concepts of the marginal utility of a good, and complementarity between two goods, which were replaced respectively with the concepts of the marginal rate of substitution between two goods, and a revised conception of complementarity that required the presence of three goods. These changes did not alter any of the standard results about consumer equilibrium, but the implications for the meaning of utility were substantial: A concept that described mental impulses (marginal utility) was replaced by a behaviourist concept (marginal rate of substitution).

In conclusion, we note that Robbins assembled the elements of a new conceptual framework by joining together the scarcity definition of economics, the positivist conception of method, and the ordinalist view of utility. The only piece missing from the modern view was a behaviourist interpretation of ordinal utility, and that was supplied by others.

IV. Debate Between the Schools

We have described two internally consistent but mutually incompatible conceptual frameworks. Apparently, the ordinalist framework eventually came to dominate the exposition of economic theory, but tracing this movement is difficult.³⁷ The ordinalists did not convert the members of the material welfare school, but students were won over. The material welfare school died out gradually as it failed to reproduce itself. In this section of the paper we recount these developments as reflected in the leading journals and books.

Replies to Robbins

The initial responses to Robbins' Essay were unfavorable, although muted. In the same year as it was published, the Economic Journal offered two critical reviews. The first, by Cannan, was directed primarily at Robbins' definition, the apparent virtues of which failed to attract him. It appeared to Cannan that Robbins had broadened the definition of economics to the point where it encompassed most of life. For example, Robbins saw the tradeoff between pursuit of pleasure and fulfillment of duty as an economic decision, whereas Cannan viewed it as "one of the problems of life." (Cf. also Janes (1933))

In a second review, entitled, "How Do We Want Economists to Behave?", Lindley Fraser (1932) pointed out that the scarcity definition had not been distilled from the actual practice of economists. Economists had long concerned themselves with comparing the well-being of different segments of the population, yet Robbins defined this practice out of economics. Robbins had proceeded by laying down a definition of economics and deducing the activities which economists could legitimately pursue.

Later (1937), Fraser characterized two methods of definition: "positive" and "normative". He reasoned that the material welfare definition is positive because it describes the actual practice of economics, whereas the scarcity definition is normative because it prescribes the appropriate practice for economics. Robbins was portrayed by Fraser as defining economics normatively while advocating the exclusion of norms from economics.

Fraser also criticised Robbins' application of scientific method.³⁸ He claimed that it was not the rigor of scientific method that Robbins had imposed on the practice of making interpersonal comparisons of utility, but rather a variant of the skeptical method. According to Fraser, people agreed that there was "no ground for supposing that poor men are in general less capable of

enjoying a given amount of wealth than rich men" (p. 562). From this, it followed that egalitarian policies were likely to increase welfare, even though "the metaphysical doubt remains." Thus, while one could never rule out the possibility that redistributive policies would decrease welfare there was no reason for acting on the basis of this unlikely state of affairs, instead of the one that people considered more likely.

Little more was written about these issues until Harrod raised them again in his essay entitled "Scope and Method of Economics" (1938). He, too, was critical of the practice of writers who stipulated methods and definitions instead of discussing those actually employed by economists. The suggestion that economists limit themselves to developing causal laws, and leave it up to policy-makers to decide which course of action would be pursued, was illegitimate as it was "in manifest contradiction with the actual practice of economists." (p. 388) Robbins' proscriptions were seen to entail the principle that economists offer no advice whatsoever, as a result of which the interest in their causal laws would diminish markedly.

The advisory role assumed by economists also formed the basis for Harrod's dissent on the matter of interpersonal comparisons of utility. Economists could not afford to

reject the common sense view of such comparisons. The objection that they were unscientific

would be very weighty if economics itself were a mature and exact science. Yet in fact its achievements outside a limited field are so beset on every side by matters which only admit of conjecture that it is possibly rather ridiculous for an economist to take such a high line ... (p. 396)

While it was necessary to assume equality of ability for satisfaction in order to make comparisons, this assumption, when used with care, need not lead to problems.

Robbins' response to Harrod, which appeared in the Economic Journal a few months later, merely reiterated his earlier positions. (1938b) In this and another article written at the same time, he insisted that the question of the scope of economics was dead. (1938a, p. 344)

One cannot but come away from this discussion between Robbins and his critics with a sense of dissatisfaction. They argue past each other, instead of defining the issue clearly. Neither side seems to appreciate that the other is using the same words to mean different things. Consider for example the fate of the term "utility." We mentioned that Pareto distinguished utility (usefulness) from ophelimity

(satisfaction of desire). Robbins used one name, utility, to refer to both concepts. Pareto had shown that ophelimity was not comparable, but Robbins discussed the incomparability of utility. In Robbins' Essay the meaning of "utility" to the material welfare school is being obscured.

Another sleight of hand occurred in the examples used to illuminate the debate about interpersonal comparisons. The material welfare school compared the rich to the poor, speaking in terms of abstract individuals widely separated on the scale of material well-being. Robbins made comparisons in terms of named individuals who were not so far apart in terms of income. This shift in examples affects the plausibility of the assertions that levels of welfare can be compared.

Ordinalist Welfare Economics

It appears unlikely that the work of Robbins and Hicks and Allen could, in isolation, precipitate the dramatic changes in the practices of economists that occurred. However, the development of the literature on compensation criteria may offer a clue to the acceptance of Robbins' framework.

Harrod had noted that Robbins' scientific ideal would not allow economists to endorse repeal of the Corn Laws

which almost all British economists had endorsed. (1938, p. 388) Kaldor (1939) suggested that the repeal of the tariff was justifiable because the increase in wealth brought about by this reform, if redistributed appropriately, was more than sufficient to put everybody at the same level of utility as previously. Thus, repeal of the Corn Laws made a Pareto improvement possible by appropriate wealth redistribution. This procedure promised to rank a state of the world by comparing the hypothetical redistributions it permitted to other actual states of the world, using the Pareto criterion. According to Kaldor, using hypothetical rather than actual redistributions permitted economists to make policy recommendations without making value judgements (Kaldor 1939, p. 550). Use of the Pareto criterion made interpersonal comparisons of utility unnecessary. Thus, it appeared that some of the conclusions of the material welfare school might remain intact, even when Robbins' strictures were obeyed.

The recommendations which flow from Kaldor's principle are sometimes different from the recommendations of the material welfare school. Suppose Pigou and Kaldor are debating the desirability of a redistribution policy that raises marginal tax rates at low incomes and lowers marginal tax rates at high incomes. This policy is expected to raise

the national income, the increase accruing to the rich. Pigou could claim that the loss in welfare imposed upon the poor is material by definition, whereas the gain enjoyed by the rich is not material. It follows from Pigou's welfare criterion that the redistribution will produce an economic loss. However, Kaldor could stand this argument on its head. If the eventual gain in income to the rich resulting from the tax policy exceeds the loss in income to the poor, then the wealth is increased, so the policy will cause an economic gain. The difference in conclusions occurs because Kaldor's approach requires the economist to proceed as if a dollar were equally valuable to everyone, whereas Pigou's requires the economist to proceed as if a dollar were more valuable to the poor than to the rich. Thus, Kaldor made a different conventional judgment from Pigou, rather than no judgment. However subsequent criticism of compensation criteria did not consider this point. This suggests that a generation of economists was trained to believe that science treats a dollar as equally valuable to everyone, whereas a nonscientific approach treats a dollar as more valuable to the poor than to the rich.

Nevertheless, compensation criteria did offer some degree of rapprochement between the two schools. In the

Introduction to his textbook on the new welfare economics, Melvin Reder precedes his development of compensation criteria with the statement that:

...if our welfare criterions were applicable only to the few policies that harm none, welfare economics would be quite sterile. Fortunately, this is not the case. (1947, p. 18)

Subsequently, the technical difficulties with compensation criteria were exposed by Paul Samuelson (1950) and W.M. Gorman (1955). One may wonder whether the new welfare economics would have been so readily adopted in the late 1930's had its "sterility" been evident at that time.

V. Evaluating and Explaining the Ordinalist Revolution

The body of this paper has reconstructed the conceptual frameworks of the two schools of thought involved in the debate on the possibility and relevance to economics of interpersonal comparisons of utility. A comparison of these frameworks leads to the conclusion that phrases such as "the comparability of utility across persons" meant different things to each school. The observation that the earlier conceptual framework was not generalized by the later motivates a reconsideration of the question of whether scientific progress occurred. To this we now turn.

Received history of economic thought accounts for the difference between the two schools in terms of rival views of the scope and method of economics. Thus, material welfare economics is seen as normative and the banishment of interpersonal comparisons of utility as the consequence of the attempt to make economics a positive science. (cf. Blaug [1962], 1978, pp. 636-637) This view is in keeping with Robbins' recollections:

All that I had done was to assert, in regard to discussion of economic affairs, the distinction between propositions involving existence and obligation, well recognized elsewhere since Hume pointed out the

distinction between "ought" and "is".

(Robbins, 1971, p. 148)

Yet, as we have pointed out in our discussions of scope and method above, material welfare economists were well aware of this distinction. They did not consider normative statements to be part of the economics they studied. Further, they affirmed "Hume's guillotine" in much the same breath as they made statements that were later criticized for ignoring it.

In his discussion of the development of utility theory from 1790 to 1915, Stigler pointed to the method of empirical investigation by appeal to "casual knowledge" used by economists practising during this period. He went on to suggest that:

"Had specific tests been made of the implications of theories, the unfruitfulness of the ruling utility theory as a source of hypotheses in demand would soon have become apparent...That such able economists were delayed and distracted by the lack of a criterion of refutable implications of theories should be a finding as useful to us as any of the fine theoretical advances they made" (1950, p. 396)

It is true that the use of evidence from introspection distinguished the empiricism of the material welfare school from the positivism of the scarcity school, but this does not account for the fact that the former were not quick to abandon their version of utility theory.³⁹ While their conception of utility was a cumbersome device for price theory, it was well adapted to the examination of propositions about material welfare, which were the major preoccupation of the school.⁴⁰ Moreover, their conception of admissible scientific evidence was congruent with their view of utility. The belief that utility was common to people made introspection an appropriate empirical tool. The fact that the production of utility was linked to the material end of the hierarchy of needs made the incidence of utility readily observable, and so offered a place for observations based on everyday experience.

The theses that economics developed as it did in the early decades of this century because it confused normative and positive concepts, or because of inadequate scientific method, must be rejected. They attribute to apparent differences in scope and method the effects of differences in research agenda. An account of the doctrinal changes of the 1930's must concentrate on differences in research

agenda which influenced the two rival schools' definitions of "economics," and the denotation they gave to the term "utility".

Each school was guided by a separate definition of economics, which mandated that they focus their attention on different phenomena. Considerations of scarcity directed economists to study the production and exchange of all commodities, for which the appropriate concept of human behavior is preference, or ordinal utility. Considerations of material welfare mandated concentration on the use of a restricted class of commodities for which the canonical concept of human behavior is the satisfaction of needs or "wants". While intensity of preference across people could not be ranked in any way that would not be considered arbitrary, interpersonal intensity of needs could be ordered in a way that would only be considered arbitrary by a sceptic. However, in the presence of confusion as to the concept of utility being appealed to, it was possible for the scarcity school to characterize material welfare economics as guilty of subscribing to arbitrary conventions or "value judgements", and to explain the persistence of these practices by the neglect of positivist scientific method. Similarly, it was possible for the material welfare school to interpret the strictures of ordinalists on interpersonal

comparisons of utility as mere scepticism on the part of economists who appeared prepared to hamstring the science by giving disproportionate weight to possible but unlikely configurations of utility among people.

The significance of this account for the historiography of economics is that it requires separate consideration of two questions that have hitherto been answered in the same breath. One concerns the explanation of the ordinalist revolution, while the other relates to its evaluation. The common view of the ordinalist revolution, that focusses on differences in scope and method, permits one to argue that the explanation of the ordinalist revolution is that economists adopted a more rigorous conception of scientific method, and preserved from the older school only that which stood up to the tests of this new method. The importance of this type of historical account is, of course, that it permits the sure inference that progress occurred.

In contrast, our account renders the explanation of the change a more complicated, and its evaluation problematic. Comparison of the methodological merits of the two schools does not do justice to the differences between them. Nor can it be regarded as an adequate summary of the considerations that would have contributed to an economist's "choice" to pursue one or the other. The two research agenda select different subjects as worthy for study, and

develop different tools of analysis. While we have remarked that compensation criteria might have minimized the early apparent differences between ordinalist and material welfare economics, the wide gulf between them suggests this can only be satisfactory as a partial explanation.⁴¹ The upshot of this investigation is that, in order to provide a more complete explanation of the ordinalist revolution, it now seems necessary to examine the relationship between academic economics and the wider intellectual and political climate.

One can only talk unequivocally about the progress of a science when its goals remain the same. The comparison of the relative merits of the schools is thus confounded by the fact that the work of neither encompassed that of the other. The period under consideration offers two yardsticks against which the achievements of economics are to be measured. It is necessary to balance the gains in understanding markets which the ordinalist program permits against the losses in understanding human welfare incurred by abandoning the material welfare perspective. We can do no better than to echo Lindley Fraser (1937, p. 36), who, having discussed the scarcity and material welfare definitions of economics, despaired of objective criteria for adjudicating between them. He concluded that the choice "would have to rest largely on the individual temperaments of the persons concerned."

FOOTNOTES

1. For example, Kenneth Arrow, referring to the earlier school, wrote:

...the proponents of measurable utility have been unable to produce any proposition of economic behavior which could be explained by their hypothesis and not by those of the indifference-curve theorists. (1963, p. 9)
2. In his Essay on the Nature and Significance of Economic Science ([1932], 1937) Lionel Robbins stated that this was "(t)he definition of Economics which would probably command most adherents, at any rate in Anglo-Saxon countries." ([1932], 1937, p. 4).
3. The following is a partial list of questions that material welfare economists claimed to answer and ordinalists claimed were unanswerable by economics: Is a dollar more valuable to the average poor person than to the average rich person? Should economists give different weight to additional income for the rich and poor when doing cost-benefit analysis? Does a hungry person need food more than a bored person needs theater tickets? If income is redistributed to the poor, with no change in total income, then does national welfare go up or down? Is there an economic justification for progressive income tax schemes?

4. This is so, even though, to be accurate, a comparability value judgement defines an equivalence class in L , in the sense that elements of this class will return the same results for interpersonal comparisons of utility. The class will contain elements of L that are related by positive monotone transformations. By this it is meant that the same positive monotone transformation is applied to every individual's utility function in the element selected by the comparability value judgement. This invariance condition is called "ordinal level comparability" by Sen (1977, p. 1542).
5. Standard references are Mark Blaug (1978) and Joseph Schumpeter (1954).
6. Jevons' disappointment at his lack of acclaim is displayed in a paper entitled "The Noxious Influence of Authority," included in Jevons, (1871). Cf. also, Hutchison (1933, Ch. 2).
7. Some details of the works of continental writers are given in Emil Kauder (1965).
8. When Bentham takes up the issue of measurement ([1776] 1948, Ch. IV) he describes adding together the utilities of different people, which assumes that the

utilities have the same properties as weight. However, he stresses that this exact process can be followed in ideal cases, but not in every case.

9. For a discussion of Edgeworth's work, see Menachem Yaari (1981).
10. Elsewhere, Jevons appears to have expressed a different opinion, indicating that records of transactions kept by commercial enterprises would afford the necessary data for measuring "pleasures and pains" ([1871] 1911, pp. 10-11). Irving Fisher (1927, p. 158) offers this passage as evidence in favor of the view that Jevons considered utility to be measureable. It has also been pointed out by George J. Stigler (1950, p. 320) that Jevons implicitly employed interpersonal comparisons of utility in his reference to "trading bodies."
11. A reading of the appendices of Pigou (1920) and Marshall (1890) will convince the reader that these economists' use of cardinal concepts did not result from limited mathematical vision.
12. Cf. Fisher (1927). Ragnar Frisch's "New Methods of Measuring Marginal Utility" (1932) is dedicated: "To Irving Fisher(,) the pioneer of utility measurement."
13. In his inaugural lecture at Cambridge, Marshall noted that a "task [that] most properly belongs to the

- economic organon" was the computation of benefits of industrial or social change, "taking account of the fact that the same sum of money measures a greater pleasure for the poor than for the rich." (1885, p. 31).
14. The term "material welfare school" is our own, although, as we have mentioned above, Robbins ([1932], 1937) stated that material welfare was the subject matter of economics at the time. He ascribed the material welfare view to Edwin Cannan, Alfred Marshall, Arthur C. Pigou and John Bates Clark ([1932], 1937, p. 11). Other writers use different categories. Schumpeter (1954, p. 833), for example, talks of a Marshallian school of thought, "the membership of which thought in terms of a well-defined scientific organon," but fails to elucidate its defining characteristics. Tibor Scitovsky (1951) talks of the "Cambridge School," and characterizes this as a group of practical men, with little patience for the gathering storm of theoretical problems attending their inferences, which finally swept them away with the publication of Robbins', Essay in 1932. Hla Myint (1948, p. 124) identifies the "neoclassical school" of which Marshall, Cannan and Pigou are members. He also includes

Joseph S. Nicholson, Henry Sidgwick, Frank W. Taussig and Allyn Young. This school is seen as straddling the classical "man against nature" and modern "subjective" views of economics. Myint is unclear as to the relationship of his neoclassical school with the scarcity school, as well as to the origins of the latter.

15. Thus, Cannan maintained that, "Although everyone is agreed that the satisfaction of hunger is economic and the satisfaction which a Tibetan fanatic feels when he has himself immured for life in the dark is non-economic," it is possible to "proceed from the undoubtedly economic at one end of the scale to the undoubtedly non-economic at the other end without finding anywhere a fence to climb or a ditch to cross" ([1914], 1928, p. 4).
16. These conditions relate to the concept of rationality in the work of the material welfare school. See below pp. 23-25.
17. This was the way in which Pigou planned to employ the "measuring rod of money" in the analysis of welfare. ([1920], 1932, p. 31).
18. Pigou gave careful consideration to the findings of eugenicists. In a chapter entitled "The National

Dividend and the Quality of the People" (Pt. I, Ch. X) he faced the argument that economic policies would be devoid of long-run effect, since the problem they were designed to cure was hereditary. He proposed that improvements in the quality of education and sanitation would cause improvements in environment, particularly in the area of child-rearing, that would be transmitted to future generations.

19. Marshall was quite explicit in his discussion of the role of economics in the development of the human race. Thus, while the proximate reason for the development of policies to alleviate poverty came from its deleterious effects on industrial efficiency, a more profound reason was that it stultified the development of man's "higher nature." This aspect of Marshall's thought is discussed in detail by Talcott Parsons (1931), who lists the facets of higher nature envisaged by Marshall as: energy, initiative, enterprise, rationality, frugality, industry and honorable dealing (1931, p. 107).
20. The distinction to be discussed is merely to be regarded as a useful terminological device. It is not intended to suggest that Pareto is to be counted among the ranks of material welfare economists, or to imply

that material welfare views were prominent on the continent (A hierarchy of wants is discussed in Menger ([1871], 1976, Ch. 3), however).

21. The idea that interpersonal comparisons might have an objective rather than a subjective basis is a theme of current philosophical inquiry. For example, in the Theory of Justice, John Rawls compares the material well-being of different people by an index of "primary social goods," rather than subjective satisfactions. Rawls' approach can be viewed as extending the idea of material well-being into a setting of moderate scarcity, where everyone's basic needs are satisfied.
22. "Le bien-etre materiel." He did not attempt explicitly to justify this choice, but seems to have had in mind some Spencerian ideas of evolutionary fitness. Evolution is seen here as improvement rather than adaptation.
23. Pareto asserted that a rational person would view the two as identical. Thus, in contemporary usage, rationality was viewed as "doing what is good for you."
24. There are some difficulties with this approach, in particular that the norm may not be easy to establish, and may vary considerably across tasks, cultures and

- even individuals of different physical size or constitution. However, these do not vitiate the claim that deviations from the norm are measurable in principle. For a discussion of these matters, see Sen (1981, pp. 11-14).
25. The greatest divergence between calculations of ophelimity and utility was believed to be present where the planning of expenditures for the future was involved. This was held to have a deleterious effect on material welfare, as a result of the lower rate of capital formation it engendered (Pigou, [1920], 1932, pp. 24-30).
26. It was the argument of Hobson and the "humanist school" that even if someone desired possession of an object that was capable of satisfying their wants it did not follow at all that these wants would be satisfied by endowing the person, with the good in question: "the amount of utility or welfare to be got and of any goods depends upon the character, the natural or acquired capacity of the particular consumers or classes of consumers into whose hands they fall." (Hobson 1914, p. 37). Extracting utility from goods was a skill which had to be learned in the same way as productive skills needed to be. Robson (1925, Ch. 2) presented a more

detailed study in this vein, in which he demonstrated that variations in family income around a low level were uncorrelated with occurrence of rickets in the children concerned. He took these and other findings on the lack of relationship between health and income, as evidence that the principal needs of the time were for education in the best use of income to satisfy wants and that increases in income or payments in kind alone would not help.

27. This quote is characteristic of the language of the material welfare school. The term "want" is often used to mean the objective fulfilment of a need and the corresponding subjective pleasure. In retrospect the material welfare school could have avoided confusion by observing Pareto's distinction more rigorously; however their mode of expression is not inconsistent with ordinary speech.
28. Sen (1973, p. 16) observes that utilitarianism is, in general, "supremely unconcerned with the interpersonal distribution" of total utility, and points out that maximising the sum of total utility will lead to an egalitarian outcome only in the special case in which everybody has the same utility function. The assumption of identical utility functions was attacked

by Robbins and others, which "gave utilitarianism a reputation for being equality-conscious." From the above, it is clear that the "special case" arises from the particular conception of utility held by the material welfare school, and, indeed, any assignment of utility indices that varied dramatically across persons would be considered inadmissible. Only when "utility" is interpreted in terms of ophelimity does the egalitarian version of utilitarianism become a special case, placed on an equal footing with all other possible assignments of utility functions to individuals.

29. This particular solution to the allocation problem is reminiscent of Edgeworth's formulation of the problem of the "Utilitarian Calculus" (1881, p. 56). The difference between that two approaches is that Edgeworth believed that the pleasures derived by all people from all commodities may be compared, whereas the material welfare school confined itself to a more modest list of commodities. Edgeworth's approach is discussed in Yaari (1981).
30. What is remarkable is that the process of averaging was advocated by economists who have gained a reputation for being the forerunners of the more modern sort of

economics, in which "interpersonal comparisons" are vigorously eschewed. Wicksteed, whom Blaug ([1962] 1978, p. 514) cites as a precursor of Robbins' conception of the scope of economics, argued that there could be no doubt that the pain experienced by torturing one hundred men was greater than that experienced by another hundred men each subject to a gnat bite. "There might in one odd case be extraordinary sensitivity, and in another extraordinary anaesthesia, but they would not be typical." (1932, p. 149). Similarly, Pareto, whom Hicks and Allen (1934, pp. 52-54) name as the father of ordinal utility theory, argued that comparison of utilities (as opposed to ophelimities) of two people was legitimate as long as they did not depart too much from the average. (Pareto, 1896, Vol. II, pp. 48-49).

31. Pigou saw this motivation as emanating not from the desire for "knowledge for its own sake", but from "the social enthusiasm which results from the sordidness of mean streets and the joylessness of withered lives" ([1920], 1932, p. 5). Marshall believed that the possibility of banishing poverty depended on the outcome of economic investigations, and imparted to them "their chief and their highest interest". ([1890],

1920, p. 4)

32. From what one can judge, this book was for many years the main source of information on methodology, to the extent that such information was sought after. Schumpeter refers to the "excellent performance of J.N. Keynes that settled most...methodological issues...to the satisfaction of the profession. For two decades this book held a well-deserved position of authority." (1954, p. 824) D.H. Robertson affirms its importance, but is more reserved about the interest it excited (1951, p. 14).
33. The findings of the Royal Commission on the Poor Law are cited frequently by Pigou and Marshall.
34. Much of Robbins' argument was anticipated by Frederic Benham (1930), who condemned "economic welfare" as a loose concept, vulnerable to misinterpretation, and the "law of diminishing marginal utility" as the result of "an amateur incursion into the domain of psychology." (p. 184). However, Benham was more skeptical about the scarcity conception of economics that Robbins was to introduce. The scarcity definition was not unknown to the earlier generation of economists. J.N. Keynes explicitly rejected the notion that political economy is concerned with scarcity or that "specially

- reasonable adaptation of means to ends" (1890, p. 35).
35. There were two positivisms in the history of philosophy, logical positivism being the twentieth century version. Cf. the articles entitled "Positivism" and "Logical Positivism" in Paul Edwards (1967).
 36. This claim takes a somewhat different form in different writing. Cf. for example, Karl Popper ([1934], 1972) and the collection of writings in Alfred Ayer (1959).
 37. Fraser (1938), in a review of Wootton's Lament for Economics (1938), indicated that the views of "Robbins and his colleagues are utterly unrepresentative of economists as a whole." (p. 196). By contrast, Harrod (1938, p. 388), in the article referred to below, remarked that in recent years the history of thought had been discussed far more from the standpoint of the theory of exchange than from the standpoint of improving material welfare.
 38. Fraser's identification of ordinal utility theory with the skeptical method, rather than the scientific method, anticipated seminal criticisms made years later by C. West Churchman (1966). A full account of Fraser's concept of economic method is found in Economic Thought and Language (1937). This admirable

- and much neglected work discussed economic theory from the viewpoint of the philosophy of language. The philosophy of language has had profound influence on the other social sciences; Fraser is unique in trying to work out some of its implications for economics.
39. Stigler referred to the aspects of this theory that were later generalized, as a result of the replacement of the additive utility function by the generalized utility function, and of the measurable utility function by the non-measurable one.
 40. It should be noted that, in this paper we have not dealt with the question of whether Stigler's judgement is appropriate for economists of earlier generations than the material welfare school.
 41. Our account suggests that the ordinalist revolution was not unanimously accepted by economists. Indeed, Pigou maintained his belief in the material welfare program into the 1950's (Cf. for example, Pigou (1951)), and there do not appear to have been any conversions of faith.

BIBLIOGRAPHY

- Ayer, Alfred J., (ed.) Logical Positivism. Glencoe, IL: Free Press, 1959.
- Arrow, Kenneth J. Social Choice and Individual Values. Yale University Press, First Edition, 1963.
- Benham, F.C. "Economic Welfare." Economica, O.S. June 1930, 10 pp. 173-187.
- Bentham, Jeremy. A Fragment of Government and the Principles of Morals and Legislation. Edited by W. Harrison. Oxford: Basil Blackwell, [1776], 1948.
- Beveridge, W.H. The London School of Economics and Its Problems. London: G. Allen and Unwin, 1960.
- Blaug, Mark. Economic Theory in Retrospect. 3rd ed. Cambridge University Press, [1962], 1978.
- Cannan, Edwin. "Review of Robbins' 'An Essay on the Nature and Significance of Economic Science'". Econ. J., 1932, v. 42, pp. 424-427.
- _____. Wealth. 3rd ed. London: Staples Press [1914] 1928.
- Churchman, C.W. "On the Intercomparison of Utilities", in The Structure of Economic Science: Essays on Methodology. Ed. Sherman Roy Krupp. New Jersey: 1966.
- Edgeworth, Francis Y. Mathematical Psychics, New York, A.M. Kelley, [1881] 1961.

Edwards, Paul (ed.) Encyclopaedia of Philosophy. New York: Macmillan, 1967.

Fisher, I. Mathematical Investigations in the Theory of Value and Price. New York: A.M. Kelley, [1892] 1965.

_____. "A Statistical Method for Measuring 'Marginal Utility' and Testing the Justice of a Progressive Income Tax" in Economic Essays Contributed in Honor of John Bates Clark. Ed. J.H. Hollander. New York: MacMillan, 1927, pp. 157-193.

Fraser, Lindley. Economic Thought and Language. London: MacMillan, 1937.

_____. "How Do We Want Economists to Behave?" Econ. J., December 1932, v. 42, pp. 555-570.

_____. "Review of Lament for Economics by Barbara Wootton." Econ. J., June 1938, v. 48, pp. 196-210.

Frisch, Ragnar. New Methods of Measuring Marginal Utility. Beitrage zur Okonomischen Theorie #3. Tubingen: J.C.B. Mohr, 1932.

Gorman, W.M. "The Intransitivity of Certain Criteria Used in Welfare Economics." Oxford Econ. Pap., 1955, 7, (1), pp. 25-35.

Harrod, R.F. "Scope and Method of Economics." Econ. J., 1938, 48, pp. 383-412.

Hicks, J.R. "The Foundations of Welfare Economics." Econ. J., 1939, 49, pp. 696-712.

- _____. and R.G.D. Allen. "A Reconsideration of the Theory of Value", Parts I and II." Economica N.S., 1934, 1, pp. 52-76 and 196-219.
- Hobson, J.A. Work and Wealth. London: MacMillan, 1914.
- Hutchison, T.W. A Review of Economic Doctrines, 1870-1929. Oxford University Press, 1953.
- Janes, George M. "Review of Robbins' 'Nature and Significance of Economic Science'". Amer. Econ. Rev., December 1933, v. 43, pp. 698-699.
- Jevons, W.S. Theory of Political Economy. 4th ed. London: MacMillan [1870] 1911.
- _____. Political Economy. New York: American Book Company, 1905.
- Kaldor, Nicholas. "Welfare Propositions in Economics." Econ. J., 1939, 49, pp. 549-552.
- Kauder, Emil. A History of Marginal Utility Theory. Princeton University Press, 1965.
- Keynes, J.N. Scope and Method of Political Economy. 4th ed. London: MacMillan, [1890] 1917.
- London School of Economics. Calendar. London: 1920-1940.
- Marshall, Alfred. The Present Position of Economics. London: MacMillan, 1885.
- _____. Principles of Economics. 8th ed. London: MacMillan, [1890] 1920.

- Mill, J.S. "On the Definition of Political Economy; and On the Method of Investigation Proper to It," Essays on Some Unsettled Questions of Political Economy. 1844, pp. 304-339.
- Myint, H. Theories of Welfare Economics. Harvard University Press, 1948.
- Pareto, V. Manuel d'Economie Politique. Paris: 1906.
- Pareto, V. Cours d'Economie Politique. Two Volumes. Lausanne: 1896-97.
- Parsons, T. "Wants and Activities in Marshall." Quart. J. Econ., November 1931, 46, pp. 101-140.
- Pigou, A.C., "Some Remarks on Utility" Econ. J., March 1903, pp. 58-68.
- _____. The Economics of Welfare. 4th ed. London: MacMillan, [1920] 1932.
- _____. "Some Aspects of Welfare Economics". Amer. Econ. Rev., 41, (3), June 1951, pp. 290-9.
- Popper, Karl R. The Logic of Scientific Discovery. London: Hutchinson, [1934], 1972.
- Rawls, John. A Theory of Justice. Harvard, 1972.
- Reder, M.W. Studies in the Theory of Welfare Economics. New York: Wiley, 1947.
- Robbins, L. Autobiography of an Economist. London: MacMillan, 1971.

- _____. An Essay on the Nature and Significance of Economic Science. London: MacMillan, [1932], 1937.
- _____. "Live and Dead Issues in the Methodology of Economics." Economica N.S., August 1938, 5, pp. 342-352. (a)
- _____. "Interpersonal Comparisons of Utility: A Comment." Econ. J., December 1938, 48, pp. 635-641. (b).
- Robertson, Denis H. Utility and All That. London: G. Allen and Unwin, 1952.
- Robson, W.A. The Relation of Wealth to Welfare. New York: MacMillan, 1925.
- Samuelson, P.A. "Evaluation of Real National Income" Oxford Econ. Pap. (1950) N.S. 2, pp. 1-29.
- Schumpeter, J.A. History of Economic Analysis. London: George Allen and Unwin, 1954.
- Scitovsky, Tibor. "The State of Welfare Economics." Amer. Econ. Rev., June 1951, 41, pp. 303-315.
- Sen, Amartya. On Economic Inequality. Oxford University Press, 1973.
- _____. "On Weights and Measures: Informtional Constraints in Social Welfare Analysis," Econometrica, 45 (7) pp. 1539-1572.
- _____. Poverty and Famines. Oxford University Press, 1981.

- Stigler, G.J. "The Development of Utility Theory." Journal of Political Economy, 1950, 58, pp. 307-328 and 373-397.
- Taussig, F.W. Principles of Economics. MacMillan, [1911], 1946.
- Wicksteed, P.H. The Commonsense of Political Economy. London: Routledge, [1910] 1932.
- Wootton, Barbara, Lament for Economics. London: Unwin, 1938.
- Yaari, Menachem E. "Rawls, Edgeworth, Shapley, Nash: Theories of Distributive Justice Reexamined" J. Econ. Theory, 24, 1981, pp. 1-39.