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Two major episodes of intellectual change defined the modern approach to utility theory and welfare economics: the "marginalist revolution" of the 1870s, and the "ordinalist revolution" of the 1930s. This article examines the theories of utility and welfare that were accepted by economists between these two episodes, and argues that the ordinalist revolution represented a fundamental change in the questions addressed by economics, not scientific progress in pursuing an unchanging agenda.

UTILITY BEFORE THE 1920s

The classical economists of the early and mid-nineteenth century lacked a systematic account of utility and consumer theory. John Stuart Mill, for example, was a utilitarian, but did not view utility maximization by consumers as an important part of economic theory.

W. Stanley Jevons, a key figure in the marginalist revolution, was the first to prove (in 1871) that in equilibrium the ratio of each consumer's marginal utilities for any two products must be equal to the ratio of their prices. Further mathematical development of this insight led to Vilfredo Pareto's demonstration that consumption could be treated as a problem of constrained maximization, parallel to production. Analytical tools developed in physics were rapidly assimilated into economics, establishing the mathematical character of the field.

Nineteenth-century economists differed on the question of whether utility was measurable. The affirmative answer can be traced back to Jeremy Bentham, the eighteenth-century philosopher who founded utilitarianism; he believed that utility was an objective quantity with the same measurable properties as weight. Some of the early marginalists, such as Francis Edgeworth, shared this view, with minor revisions. Others, such as Jevons, Pareto, and Irving Fisher, doubted that it was possible to observe and compare utilities. By 1892, Fisher had established that interpersonal comparisons of utility, and indeed all cardinal measurements of its magnitude, were unnecessary for the technical analysis of market equilibrium, thus laying the mathematical foundations for the ordinalist revolution.

Yet it was not until 40 years later that economists in general accepted the ordinalist approach. The delay was due in large part to the influence of the "material welfare" school of Alfred Marshall, Edwin Cannan, and Arthur Pigou, which had come to dominate the mainstream of English economics by the 1920s. The material welfare economists differed from the modern

(i.e., ordinalist) approach in their definition of the subject matter of economics, their methodology, and their understanding of the concept of utility.

THE MATERIAL WELFARE DEFINITION OF ECONOMICS

For the material welfare school, economics dealt with only a part of the wellbeing of the community, which Cannan described as "material welfare", and Pigou as "economic welfare." The hierarchy of motives for, and satisfactions obtained from, consumption ranged from purely economic or material at one end to purely noneconomic or nonmaterial at the other; necessities of life were at the former end, while comforts and luxuries were found toward the latter. According to Pigou, the focus on material or economic welfare allowed use of the "measuring rod of money." While nonmaterial satisfactions could not be directly measured, and could at times be undercut by policies that promote material prosperity, Pigou thought it likely that material welfare and total welfare were positively related.

In his evaluation of public policies, Pigou argued that redistribution in favor of the poor would lead to more material wants being satisfied, so long as there was no decrease in total national product. Likewise, growth in national product would also lead to increased material welfare, so long as the share of the poor did not decrease. Particularly desirable were policies such as investment in education, health care, and industrial training, which promoted both equity and growth. Relieving poverty was desirable for its own sake, because it often increased growth -- and because, as Marshall claimed, it allowed people, liberated from the wants of "the brute and the savage", to develop their "higher faculties."

THE MATERIAL WELFARE CONCEPTION OF UTILITY

At the turn of the century, two distinct concepts of utility were in use. Pareto made a clear distinction between the two: he maintained the traditional meaning of "utility" in the sense of "usefulness", and coined the term "ophelimity" to describe subjective desire, independent of need or usefulness. He concluded that the science of ophelimity was far more advanced than the problematic analysis of utility.

The material welfare school was clearly concerned with utility rather than ophelimity. Physical needs are measurable, and far more comparable between individuals than subjective desires. On the plausible assumption that people spend any increases in income to satisfy their most urgent needs first, it could be shown that additional income is more useful to the poor than to the rich. For Pigou this created a strong presumption in favor of redistribution, tempered in practice by concern for the negative effects of egalitarian policies on incentives.

Comparisons of utility were not assumed to be possible between two specific, named individuals; rather, the comparisons that mattered for public policy were between broad groups of people, such as "the rich" or "the poor." If a large enough group was examined, Marshall argued, personal peculiarities of individuals would counterbalance one another, and average material welfare would be directly related to income. This use of averages was common, not only to the material welfare school, but also to some of the precursors of the later ordinalist school, such as Fisher.

The material welfare school viewed its policy prescriptions, often including explicit implications for income distribution, as positive scientific conclusions, rather than normative value judgments. They saw themselves as part of the long tradition of British empiricism, believing that knowledge comes from experience rather than from pure reason, and favoring, in practice, attention to detail and collection of facts. They differed from modern economists in their approach to problems where empirical data was lacking; the material welfare school accepted common sense and introspection as legitimate evidence in such cases.

THE CRITIQUE OF THE MATERIAL WELFARE SCHOOL

The tradition of Cannan, Pigou, and Marshall was attacked by Lionel Robbins in 1932. He criticized the material welfare definition of economics for its narrowness; opera tickets were just as fit for study by economists as bread. Robbins introduced the now-famous definition of economics as the relationship between ends and scarce means. No hierarchy of needs was assumed; the expanded definition shifted attention from goods that yield utility to those that produce ophelimity (although Robbins did not make the distinction, and used the word "utility" for both concepts). Yet ophelimity cannot be observed or compared, even on average between groups of people. Thus the new definition of economics contained within it the basis for rejecting the interpersonal comparability of utility.

The 1930s was the period when logical positivism began to influence Anglo-American philosophy and social science. Although similar to empiricism, logical positivism had a much narrower interpretation of "observable events," discouraging the use of mental and moral concepts. In the extreme it led to behaviorism, declaring that all subjective concepts were unobservable. Robbins went a long way in this direction, claiming that no observable behavior could be explained by cardinal measurement or interpersonal comparison of utility. In consequence, he declared such measurement and comparisons to be outside of science.

For the material welfare school, utility was of course measurable and quantifiable. There is little controversy about the observation of hunger, or the measurement of infant mortality. But the shift from utility to ophelimity allowed Robbins to reject this view. Because no one can observe the satisfaction enjoyed by other people, he asserted, no one can demonstrate scientifically that income has a greater marginal utility to the poor, or that redistribution toward the poor is desirable. Statements about redistribution are merely normative for Robbins; if people disagree about the preferred distribution of resources, there is no scientific way to resolve the dispute.

Debate between the two schools of thought, appearing in the economics journals in the 1930s, largely failed to recognize the significance of the differences in definitions that divided them. There is little evidence that the ordinalists persuaded members of the material welfare school to change their views; rather, a new generation of ordinalists gradually replaced the older material welfare economists.

The supposedly value-free economics of the ordinalists, when applied to policy questions, was in fact still based on assumptions about distribution. The so-called "compensation tests" introduced into welfare economics by Nicholas Kaldor and John Hicks favored policies that maximized

national income -- implicitly assuming that the marginal utility of income was the same regardless of who received it. This is no less normative than Pigou's assumption; it is simply a different assumption.

EVALUATING AND EXPLAINING THE ORDINALIST REVOLUTION

The standard history of economic thought views the ordinalist revolution as an attempt to make economics a positive, value-free science, and to bring a more rigorous scientific method to the field. This view must be rejected: the material welfare school had a different research agenda, and a slightly broader conception of admissible scientific evidence, but was no more or less normative than modern economics. Each of the two schools was guided by a different definition of economics, for which a different conception of utility was appropriate. While intensity of subjective preferences (the new conception of utility) cannot be compared or quantified, intensity of needs (the older conception) can be.

One can only talk unequivocally about scientific progress when the same questions continue to be addressed. The gains made by the ordinalists in understanding markets must be balanced against the losses in understanding human welfare, which was better comprehended by the material welfare school.