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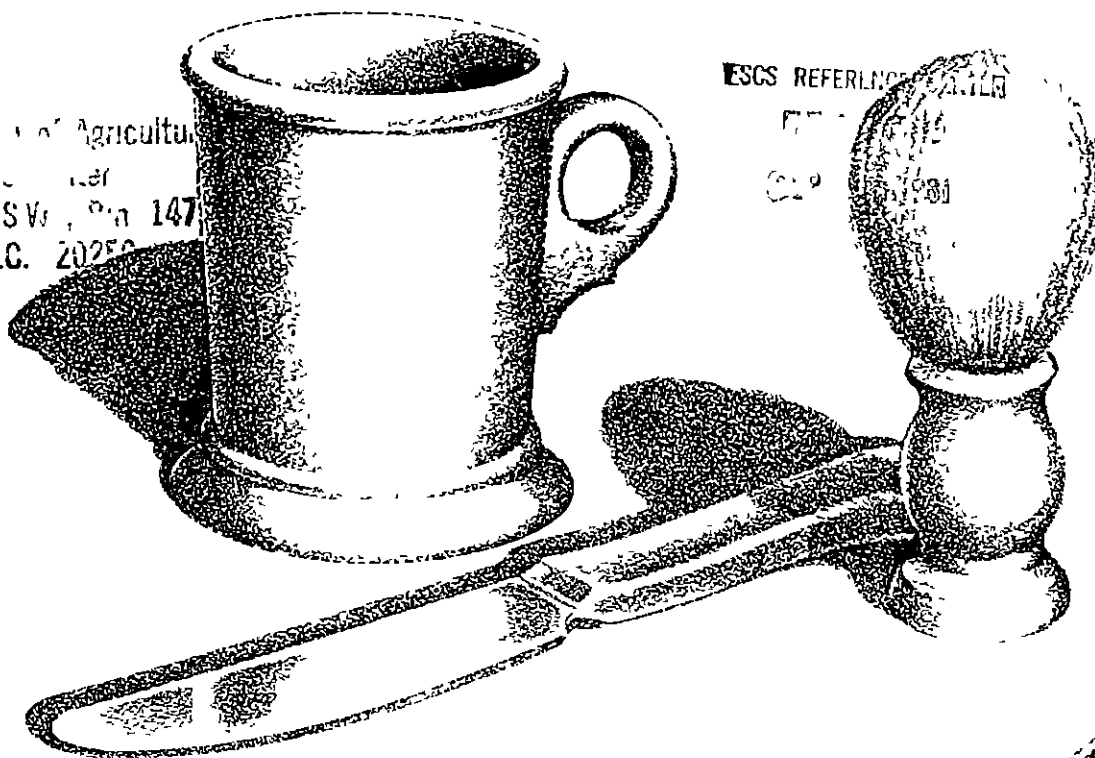
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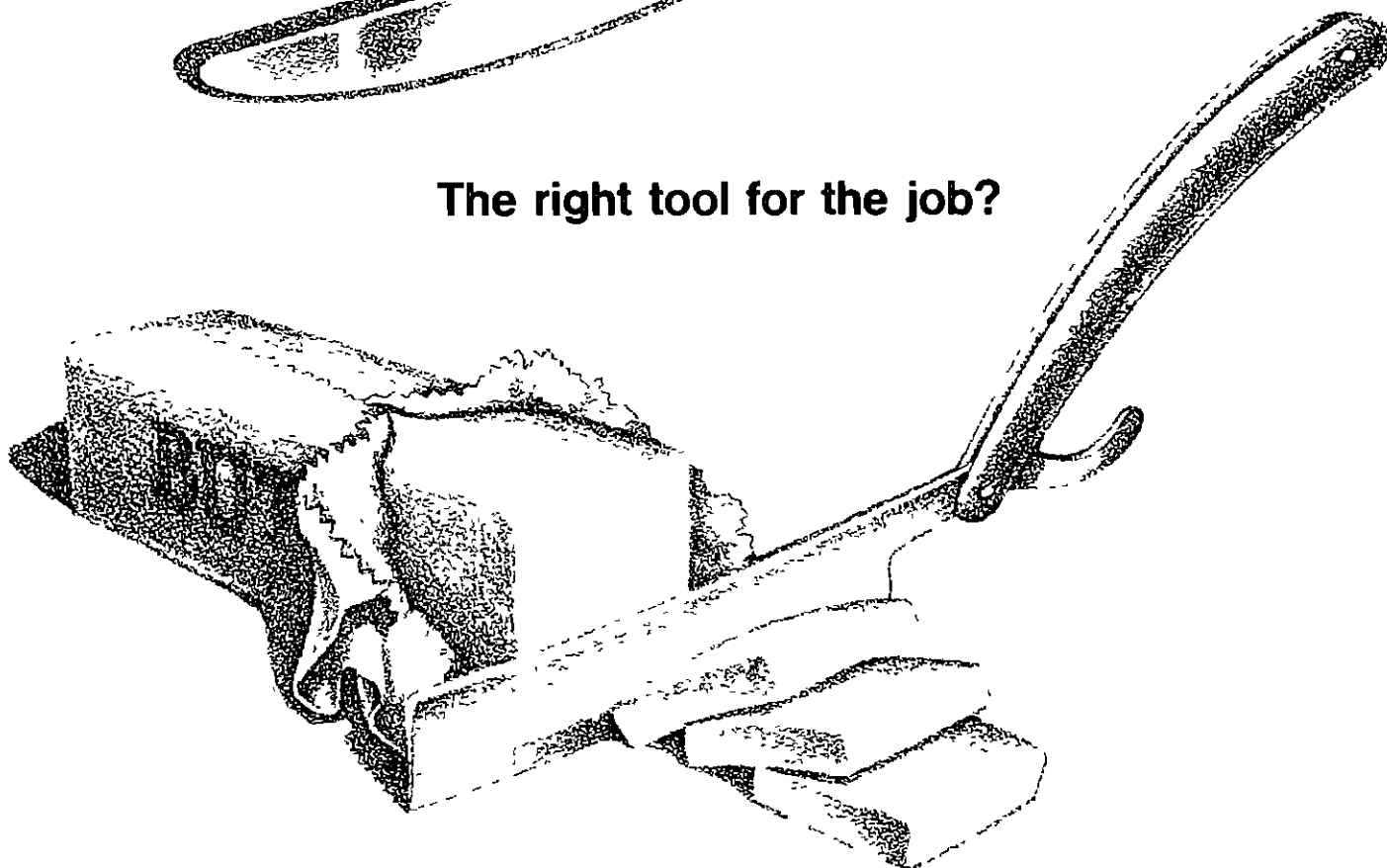
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The right tool for the job?



AGRICULTURAL ECONOMICS RESEARCH

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In This Issue

A supposition underlying most research is what has been called "the mathematical assumption." Its usual application implies that social and physical changes follow a deterministic scheme controlled by behavioral rules or laws. But for the mathematical assumption to be useful, still more is required of nature: it must display simplicity, uniformity, and unity. Even though nature is known not to satisfy these requirements completely, the mathematical assumption has proven fruitful. Archimedes made it when he worked out the principles of the lever. Galileo made it when he worked out the principles of a falling body. Newton made it when he worked out the principles of planetary motion. And economists made it when they worked out the principles of prices and quantities and of income and employment.

The mathematical assumption has not gone unquestioned. One of the most convincing objections is that it stresses quantity and can lead to a neglect of quality. Sometimes the switch from qualitative contemplation to quantitative measurement is a clear gain, as when we replaced the qualitative terms of "crisis" and "panic" with quantitative measures of intensity and duration of various phases of the business cycle. At other times, the switch remains questionable, as when we substitute quantitative measures of income per capita for qualitative indications of changes in the quality of life.

A delicate balance needs to be maintained between attaining enough simplicity and oversimplifying. William of Occam preferred the simplicity of assumptions. He was a 14th century intellectual leader who distrusted systems of thought based on abstractions. A maxim attributed to him is known as Occam's Razor: The assumptions introduced to explain a thing must not be multiplied beyond necessity. We might add that the assumptions must not be oversimplified beyond usefulness.

We calculate the orbit of the earth around the sun on the assumption that the orbit is independent of the gravitational forces of Jupiter, Mars, and the other planets. This simplifies the calculation and leads to satisfactory answers for most purposes. But not recognizing these other forces means that we cannot calculate whether the planetary system has long-run stability. We forecast prices and quantities on the assumption that markets are competitive. But not recognizing market imperfections means that we cannot evaluate the efficiency and equity of the economic system.

The first article in this issue demonstrates how the attribute of simplicity in the mathematical assumption can be worth the price of inaccuracy; it shows that a more accurate model is not worth the costs of its complexity. Five measures of consumer welfare drawn from the writings of J. R. Hicks are applied to a problem involving the effect on welfare of a ban on pesticide use in agriculture. The simplest and most easily calculated indexes prove to be sufficient as a basis for policy analysis—a conclusion anticipated by Hicks.

The second article is a reminder that some tasks require a sharp razor. Economic models that are too simple can obscure relevant relationships. Assuming competition to explain a monopolistic market simplifies the analysis, but obscures our view of the pricing system. J. M. Keynes compared the economist's "axiom of competition" to the geometer's "axiom of parallels" and showed that a noncompetitive assumption in economics, like non-Euclidian geometry in physics, can lead to increased knowledge. This article shows that Keynes made an additional assumption about human behavior that restored the characteristics of simplicity, uniformity, and unity and that enabled him to use the mathematical assumption to explain the monopolistic theory of interest, employment, and money.

Clark Edwards

Contents

1 Use of Paasche and Laspeyres Variations to Estimate Consumer Welfare Change

Dennis C. Cory, Russell L. Gum, William E. Martin, and Marie Leigh

7 Keynes' Monopolistic Theory of Employment, Interest, and Money

Clark Edwards

Research Review

18 Statistical Estimation of Firm-Level Demand Functions: A Case Study in an Oligopolistic Industry

S. Shapouri, R. J. Folwell, and J. L. Baritelle

26 Predicting Debt Reschedulings in Developing Countries

Eileen M. Manfredi

31 Special Lectures in Economics

Reviewed by Harold F. Breimyer

33 Analysis of Economic Time Series: A Synthesis

Reviewed by Robert V. Bishop

35 The Planning of Investment Programs in the Fertilizer Industry

Reviewed by Robert B. Rovinsky and David A. Torgerson