

COMMENTS ON *ECONOMETRIC MODELS*
FOR PROBABILISTIC CHOICE
AMONG PRODUCTS

JOHN HAUSER

Reprinted for private circulation from
THE JOURNAL OF BUSINESS OF THE UNIVERSITY OF CHICAGO
Vol. 53, No. 3, Part 2, July 1980
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PRINTED IN U.S.A.

John Hauser

Northwestern University

Comments on "Econometric Models for Probabilistic Choice among Products"

McFadden (this issue) has provided an econometrician's view of marketing problems. He suggests econometric techniques and philosophies that are valuable for marketing scientists. I would like to expand on his paper by providing a marketing perspective.

Fundamental Question

McFadden begins with the question, "Will housepersons buy more brand A soap if its perfume content is increased?" Although this is a marketing problem, it is far from the most basic definition of marketing. Borrowing from Kotler (1980), I would like to define marketing as the problem of,

How can we achieve research and managerial goals through understanding and influencing the exchange process?

With this and similar definitions, marketing encompasses goods such as soap, industrial products, consumer durables, health care, transportation, and even ideas. It encompasses forecasting sales, designing new products and services, communicating information to consumers, providing channels of supply and distribution, and pricing. Some marketing analyses are managerial in that they provide market intelligence to help managers achieve goals, such as improved profit, while some marketing analyses are research oriented in that they try to understand market structure or consumer behavior. Marketing tools are anything that can influence the exchange process, including the product (both the physical product and its image), advertising, promotion (price-off, coupons, sampling), price, distribution, and government policy. In one way, marketing provides the tactics to implement economic analysis, but in an equally valid way it provides the basic building blocks of economic theory: consumer behavior and the firm's response.

(Journal of Business, vol. 53, no. 3, pt. 2)
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0021-9398/80/5332-0004\$01.50

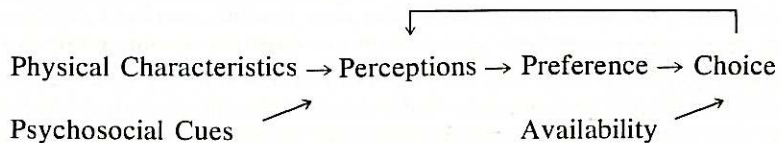
Key Elements

McFadden offers four key elements for consideration. These elements provide the basis for a mutual understanding between economic and marketing scientists. I will expand each of McFadden's elements by restating them from a marketing perspective.

1. *The goal of marketing analysis is forecasting, understanding, and control.* Forecasting consumer response is crucial for the evaluation of alternative strategies; but to formulate policy, we must use our analyses to understand the consumer-response process. We should use consumer theory coupled with consumer measurement (surveys, experiments, and observations) to provide diagnostic information that helps managers identify those strategies that are likely to have the greatest impact on sales or profit. Many marketing models provide "what if" forecasts and, when appropriate, optimization algorithms to better control the exchange process.

2. *The theory of utility maximization must be coupled with theories of information processing.* Utility maximization is a logical beginning, but utility is an elusive measure. Consumers are ill-informed, misinformed, and tend to simplify decisions. Rationality varies. We model the consumer by understanding his rationality. This includes how he gets information, interprets information, stores information, and reacts to information. It includes simplifying rules and intermediate constructs that provide a paramorphic decision-oriented model of the consumer's cognitive process.

3. *The core of a model of consumer behavior specifies probabilities of choice through a series of equations and intermediate constructs.* Basically, $\text{choice} = f(\text{product attributes, price, socioeconomic variables, experience, psychosocial cues, marketing mix})$. To provide forecasts, understand the process, and identify control points, we use a reduced-form model such as:



The intermediate constructs (perception, preference, availability) are important inputs to managerial decision and research questions. For example, we can influence perceptions through changes in the physical product or through information communicated by advertising. Perceptual maps identify perceptions and suggest strategies to influence perceptions (see the review by Shocker and Srinivasan [1979]). Failure to explicitly account for awareness or availability can make it difficult to interpret parameters in choice models. For example, it would be misleading to estimate a choice model assuming each consumer's choice is from among all available deodorants when empirically we

know that the average consumer can evaluate only three out of the 18 or more deodorants currently available (Silk and Urban 1978).

4. *The sample, questionnaire, model, analysis, and statistics should be integrated.* McFadden makes this point very well. I would add only that we must consider how the manager will actually use the information in his decision process (for one viewpoint on this issue, see Little [1970]).

Mutual Learning

McFadden's paper provides an excellent review of some new developments in econometrics. For the most part, I agree and will not repeat the details here. Instead, I will highlight what I feel marketing scientists should incorporate in their analyses.

1. *Models of probabilistic choice:* We can never predict with certainty, but we can explain much of the uncertainty. A few marketing scientists have used probabilistic models for analysis of experimental designs (Green and Carmone 1977), conjoint analysis (Johnson 1975), pretest markets (Silk and Urban 1978), and choice predictions (Hauser and Urban 1977; Punj and Staelin 1978), but this area deserves more attention (for an excellent review, see Horksy, Sen, and Shugan [1978]).

2. *Market hierarchies:* Consumers often appear to make hierarchical or sequential decisions. For example, we may hypothesize that coffee consumers first decide among ground or instant, then caffeinated or decaffeinated, then regular or freeze dried, and finally among brands. Theoretically, we want to identify any hierarchies in the choice set to improve our understanding and our predictions. Practically, this problem is important for market boundaries (e.g., in what "market" a product actually competes), market identification (e.g., which market to enter with a new product), and product positioning. McFadden reviews psychological theory (EBA) and suggests both theoretical and practical estimation techniques based on revealed preference (GEV). These are important models which marketing scientists should make greater use of. However, some marketing scientists have addressed these problems with revealed preference (Srinivasan 1979) and experimentally (Urban 1977). I feel this is an area where the synergies in methods will occur.

3. *Efficient sampling:* A basic "truth" of traditional market research is that a pure random sample is best, although you may wish to use stratification on an exogenous variable. McFadden effectively challenges this premise. New sampling techniques such as choice-based sampling, enriched samples, and multisource samples allow us to get consistent estimators at a much lower cost of data collection. These analysis techniques will make possible new marketing analyses based on warranty records, intercept surveys, and industrial client surveys.

4. *Axiomatic systems*: Marketing has benefited greatly from the use of conjoint analysis, which is based on a powerful axiomatic system (Tversky 1967). One of the strengths of McFadden's work is that it is explicitly derived from revealed preference axioms. Of course, we must also consider other axiomatic systems (e.g., Von Neumann and Morgenstern 1947) which are related to consumer behavior. I feel that axiomatic systems provide a useful basis for theoretical and applied research. A combined, compatible axiomatic system would greatly enhance the synthesis of economics, marketing, and psychology.

Summary

The purpose of this conference was to contribute to scholarly research through a synthesis of the knowledge in economics and marketing. McFadden's paper greatly contributes to this goal. I do not hesitate to recommend his paper to marketing scholars, nor do I hesitate to recommend the work in marketing to economic scholars. I strongly believe that each discipline can learn from the other. The synergy will extend our theoretical and practical knowledge of the consumer and the marketplace.

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