CHAPTER 6

The Contingent Ranking Method and Benefit Estimation*

6.1 INTRODUCTION

This chapter is a report on the results of the contingent ranking component of the Monongahela survey. In this part of the survey, respondents ranked four hypothetical combinations of water quality levels and amounts paid in the form of higher taxes and prices. We describe in this chapter how these rankings were used to estimate the benefits of improved water quality. Our work builds on an extension of the McFadden [1974] random utility model proposed by Beggs, Cardell, and Hausman [1981]. They used rankings of new goods, which were described by their characteristics, and prices to measure the potential demand for these goods. Based on this work, Rae [1981a, 1981b, 1984] used the contingent ranking method as an alternative to contingent valuation questions for valuing visibility changes. More recently, analysts have employed contingent ranking for valuing reductions in both diesel odors (Lareau and Rae [1985]) and the risk of exposure to hazardous wastes (Smith, Desvousges, and Freeman [1985]). Although we conducted our water quality survey in the middle of this research, we review all the studies and discuss their relationship to our analysis. This review includes many unpublished studies.

Although rankings of contingent market outcomes—e.g., combinations of water quality improvements and prices—convey less information than other contingent valuation responses, individuals may be more capable of ordering these hypothetical combinations than revealing directly their willingness to pay for any specific change in these amenities. Unfortunately, most past studies have tended to adopt only one or the other of these two approaches, and there has been little basis for comparing their respective estimates. As a result, we designed the Monongahela survey explicitly to include the contingent ranking method for measuring individuals' valuation of water quality improvements. The

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survey asked all respondents to rank four hypothetical combinations of water quality and payments to allow us to compare contingent valuation and contingent ranking for a common application.

To explain the economic basis for modeling consumer behavior using contingent ranking, Section 6.2 describes the random utility model, a widely applied model of consumer behavior that involves discrete choices. Section 6.3 discusses two possible methods for implementing the random utility model. Section 6.4 highlights some unresolved issues that surround the contingent ranking approach. With this background, Section 6.5 summarizes the results of the past applications of the contingent ranking approach to benefit estimation. Section 6.6 discusses the question used for contingent ranking and our empirical estimates. Section 6.7 considers some theoretical issues associated with contingent ranking benefits estimates and reports our results using the Monongahela survey data, and Section 6.8 summarizes the chapter. Section 6.9 contains references cited in this chapter.

6.2 THE RANDOM UTILITY MODEL OF CONSUMER BEHAVIOR WITH DISCRETE CHOICES

Generally, economic models of consumer behavior assume that an individual consumes some amount of every good or service that enters his utility function. The objective of these models is to describe individuals' consumption choices among all commodities.* Used in comparative static analysis, these models predict the change of consumption levels for marginal changes in the exogenous parameters or constraints to decisionmaking. McFadden's [1981] description of how individuals make major purchases notes that economists tend to model the demand for the services of durable goods to avoid modeling the discrete choice of the products themselves.† However, discrete choice models, buttressed by McFadden's [1974, 1981, 1983] persuasive arguments, and the increased availability of microdata sets, have become the norm for modeling purchases of durable goods. Moreover, detailed models based on the services of durables are difficult, if not impossible, to implement with existing data.

*Conventional models of consumer behavior assume positive levels of consumption of all goods and services to avoid dealing with corner solutions.
†For example, one might extend the time horizon in the conventional model of consumer behavior. On any particular day, a commuter will select a travel mode to reach his job. Viewed on a daily basis, modal choice is discrete because fractions of the available travel modes cannot, as a rule, be consumed in a single trip to the workplace. However, over the course of a month or a year, the individual may well select a varied menu of transport modes. Thus, with this adaptation of lengthening the time horizon, it has been argued that the conventional model of consumer behavior may be more relevant to explaining these decisions.