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**Title:** A Comparison of Direct and Indirect Methods for Estimating Environmental Benefits

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**Abstract:**

This paper compares direct (contingent valuation) and indirect (travel cost) estimation of consumers' valuations of improvements in environmental resources. It focuses on water quality improvements and their effect on recreational benefits. Indirect methods rely on the behavior of households to reveal their valuation while direct methods use surveys to ask individuals' valuations for hypothetical changes in non-market goods. Indirect methods are preferred by economists because they are based on observed behavior and are less susceptible to the bias shortcomings of survey data. In addition, direct methods are subject to greater variability and design limitations. Comparisons between direct and indirect results are frequently used to enhance the validity of the results. This paper states that these comparisons may provide limited information for either approach because of the variability of direct methods, although neither approach is free of the influence of judgment. The paper uses the Monongahela River valley in Pennsylvania as a case study (due to available contingent valuation survey data) to test the comparison of the travel cost model and contingent valuation model to determine how water quality affects recreational benefits. The incremental water quality changes tested were 1) decline from boatable to no recreation, 2) improvement in water quality from boatable to fishable and 3) improvement in water quality from fishable to swimmable.

The study finds that the contingent valuation estimates seem to be sensitive to the question format used. The travel cost estimates have a surprisingly large range between the three different travel cost models used. In fact, the two of the three travel cost models vary from the contingent valuation estimate and appear implausible. Only the simple travel cost model used based on the survey data falls within the expected range of values solicited by the contingent valuation survey. The study finds that while scrutiny of the direct survey approach is well-founded in previous literature, indirect methods have shortcomings that need to be considered before reliance is invested in observable behavior only.