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The Importance of Functional Form in the Estimation of Welfare: Discussion

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In her paper, Catherine Kling takes up the important issue of functional form in the estimation of welfare changes. Several of the issues raised are not specific to nonmarket valuation but are common for all applied work in welfare economics. Kling identifies three distinct approaches to the choice of functional form, i.e., (a) choose a simple function which is easy to work with, (b) choose a demand function which fits the data well, or (c) choose a utility function which fits the data well. However, she does not directly address the question of which approach is to be preferred. This is unfortunate, as a clear understanding of the available approaches and their relationship to economic theory is necessary in order to estimate economic welfare changes. Let me offer my own view from the "ivory tower" on these issues.

The starting point for welfare economics is the assumption of utility maximizing behavior and the equivalence of the consumer's welfare map and preference map. Utility maximizing behavior, subject to a linear budget constraint with fixed prices and income, implies certain restrictions on the resulting demand function.¹ These restrictions are frequently referred to as the integrability conditions, since they permit the reconstruction of the preference map from knowledge of the demand functions. The integrability theorem leads to two distinct approaches to applied welfare analysis, the "top-down" and "bottom-up" approaches in the terminology of Bowden. In the top-down approach the researcher starts with a particular parametric specification of the preferences, say

the indirect utility function, and derives the ordinary demand function using Roy's Identity. In the bottom-up approach, a particular parametric specification of the demand system which satisfies the integrability condition is the starting point. However, from the integrability theorem, these two approaches are equivalent, and the choice between them arbitrary. They are both, directly or indirectly, a priori specifications of the preferences and thus impose a priori restrictions on the preference map. This is unavoidable since a perfectly flexible demand system cannot be estimated by a finite number of observations (Morey).

It should be noted that there are (infinitely) many integrable demand systems that have indirect utility or expenditure functions which are unknown or impossible to express in a closed functional form. These demand systems may, in some cases, represent the individual's preferences better than demand systems for which the functional form of the preferences is known.

The point of this is that one viable approach is to let the data help us decide between different functional forms of the demand system which are consistent with the integrability conditions. This immediately raises the question about how to choose between different functional forms. I will propose this question as a research issue towards which we should expand some effort in the near future.

The functional forms estimated by Kling satisfy the integrability condition in her two-commodity world. However, she chooses to calculate the Marshallian consumer's surplus as compared with the theoretically consistent Hicksian welfare change measure-compensating variation. Although she states the differences between the Marshallian and Hicksian measures are minor, not surprising since the income effect is small in this model, I fail to

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¹ The restrictions are adding up, homogeneity, symmetry, and negative semidefiniteness of the Slutsky matrix. In addition, some technical assumptions regarding differentiability and boundedness of the income effect are needed for integrability (Hurwicz and Uzawa).

see any real advantage of using the Marshallian measures.

I also have a technical squabble with the multiplicative error structure model used in the simulations. This type of model is often referred to as a random coefficient model. The particular model in Kling's paper leads to a simple regression model with heteroskedasticity, i.e., for the linear model:

$$x = \alpha + (\beta + \epsilon)p + \gamma y = \alpha + \beta p + \gamma y + \epsilon p,$$

which should be estimated using generalized least squares techniques (see, for example, Judge et al.).

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References

- Bowden, R. "A Note on the 'Bottom-Up' Approach to Measuring Compensating Variation." *Metroeconomica* 36(1984):65-76.
- Hurwicz, L., and H. Uzawa. "On the Integrability of Demand Functions." *Preferences, Utility, and Demand*, eds., J. S. Chipman et al., pp. 114-48. New York: Harcourt Brace Jonanovich, 1971.
- Judge, G. G., W. E. Griffiths, R. C. Hill, and T. C. Lee. *The Theory and Practice of Econometrics*. New York: John Wiley & Sons, 1980.
- Morey, E. R. "Confuser Surplus." *Amer. Econ. Rev.* 74(March 1984):163-73.