Interpretations and Transformations of Scale for the Pratt-Arrow Absolute Risk Aversion Coefficient: Implications for Generalized Stochastic Dominance: Reply

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McCarl's comment to our 1986 article provides an opportunity to correct what has evidently proven to be an exercise in miscommunication. We wish to use this opportunity to address McCarl's stated concerns and to clarify our original message.

McCarl claims that our statement, "the magnitude of the risk aversion coefficient is unaffected by the use of incremental rather than absolute returns. . .," is equivalent to $r(x + c) = r(x)$, where x is an incremental return and c is the previous wealth level. Such an interpretation of our statement would ignore the distinction between the utility of wealth and the utility of incremental (or annual) returns. We did not mean to imply that wealth is an irrelevant factor in utility determination.

A proper interpretation of our statement, recognizing the wealth/incremental returns distinction, would be

$$r_w(x + c) = r_{i/c}(x),$$

where r_w is the risk aversion to wealth and $r_{i/c}$ is the risk aversion to incremental returns given previous wealth level c. By way of an example, this means that the local willingness to deviate from a $110,000 wealth level is equivalent to the local willingness to deviate from a $10,000 incremental return level when wealth is already $100,000. The equivalence holds because, to the decision maker, it is only an issue of mental accounting as to whether a wealth dollar or incremental dollar (at a given wealth level) is at risk. In each case, wealth plus the increment

totals to $110,000. Indeed, the brevity of the proof of our original theorem 2 suggests that this be a virtual tautology.

We reiterate that we did not mean to imply that wealth is an irrelevant factor in utility determination. Our intentions were to demonstrate, in general, problems with comparing risk aversion coefficients (RAC) at different outcome levels and, in particular, to introduce a conversion process that could be used with generalized stochastic dominance. The conversion process was designed to be used when, to facilitate analysis, the representation of the outcome measure has been rescaled but it is desired to recreate the original decision environment. Hence, if risk preferences have been elicited at an annual whole-farm income level but it is easier for the researcher to manipulate data on a per acre or per unit basis, the conversion process provides an approximation to make the two measures consistent.

Finally, we wish to reemphasize our precautions stated about the scaling of the outcome measure to (from) terms of ten-year net present value. Given that preference elicitations at such an outcome level are limited, the use of secondary data elicited at annual farm income levels must be viewed with skepticism. McCarl is correct that changes of wealth levels will modify utility levels unless constant risk aversion is present. However, in his examples from Lin, Dean, and Moore he has confused "wealth levels" with annual farm income levels that were used to elicit the utility functions. The example from Kaufman may be the only empirical elicitation of traditional utility functions with a wealth argument, and it is debatable whether this example represents wealth or annual income for an oil developer. Additional research in this area could prove to be fruitful.

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