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The Paternity of an Index

In the March issue of this *Review*, Benton F. Massell [5, pp. 52 ff.] uses an index of trade concentration of the form $\sqrt{\Sigma(x_i/x)^2}$ where x_i is the value of a country's trade in commodity i (or with trading partner i) in some period, while x is the country's total trade. This index appears to have come into wide use recently and, to my rather chagrined surprise, is referred to, by Massell as well as by Kindleberger [4, p. 143], Michaely [6], and Tinbergen [9, pp. 268 ff.], as the "Gini index" or "Gini coefficient."[1] Given the sudden popularity of the measure, I feel that I should stand up for my rights as its originator. It was first introduced and computed for a large number of countries in my book *National Power and the Structure of Foreign Trade* [3, Ch. 7 and pp. 157–62]. As explained there, the use of the index is indicated when concentration is a function of both unequal distribution *and fewness*. The traditional measures of concentration, generally devised in connection with income distribution and the Lorenz curve, are sensitive only to inequality of distribution, and we do owe several such measures to Gini.

The confusion on this score is the stranger as I referred at length in my book to the important work of the Italian statisticians on measurement of concentration, and particularly to Gini [3, pp. 157–58]. Upon devising the index I went carefully through the relevant literature because I strongly suspected that so simple a measure might already have occurred to someone. But no prior inventor was to be found.

To complicate the story, I must add that there was a posterior inventor, O. C. Herfindahl [2], who in 1950 proposed the same index, except for the square root. While obviously unaware of my earlier work when writing, Herfindahl did acknowledge it in a footnote [2, Ch. 1 and p. 21, n.]. Nevertheless, when the index is used for measuring industrial concentration, the second principal area of its application, it is now usually referred to as the "Herfindahl index," owing to a well-known paper by Rosenbluth [7] who has, however, recently made a valiant, but probably vain, attempt to straighten the matter out [8, pp. 391–92].

The net result is that my index is named either after Gini who did not invent it at all or after Herfindahl who reinvented it. Well, it's a cruel world.

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[1] An honorable exception must be made for Coppock [1, pp. 97 ff.].

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The Opportunity Locus in a Hedging Decision: A Correction

In my 1961 *AER* article on spot and futures prices,[1] I drew the opportunity locus between expected return (E) and risk (R) as a straight line. This is incorrect; it should be a concave function (negative second derivative). All the other results of that paper are unchanged.

The risk on a linear combination of hedged and unhedged stock is equation (1), where x refers to the fraction unhedged.

$$R = \text{var}\,[xu + (1 - x)h]. \tag{1}$$

Variables u and h are the returns derived from unhedged and hedged stock, respectively.

(a) $u = p^* - p - m$ where p^* is the expected price, p is the current price, and m is the marginal net carrying costs.

(b) $h = (p^* - p) - (q^* - q) - m$ where q is the futures price, and q^* is the expected futures price at the time the contract will be liquidated.

Solving for R, we obtain equation (2). σ_p^2 is the variance of p^*; σ_q^2 is the variance of q^*, and r is the correlation coefficient between p^* and q^*.

$$R(x) = \sigma_p^2 + (1 - x)^2\sigma_q^2 - 2r(1 - x)\sigma_p\sigma_q.$$

$$\text{(2)} \qquad \text{(a)}\ R(0) = \sigma_p^2 + \sigma_q^2 - 2r\sigma_p\sigma_q$$

$$\text{(b)}\ R(1) = \sigma_p^2$$

[1] J. L. Stein, "The Simultaneous Determination of Spot and Futures Prices," *Am. Econ. Rev.*, Dec. 1961, *51*, 1012–25.