Stochastic Orders and Decision under Risk
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CONCENTRATION INDICES AND CONCENTRATION CURVES

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For analyzing the relationship between two random variables an approach is introduced which is called the Gini method. The approach is based on the Gini mean difference, the Gini covariance, and the Gini correlation. The method is then extended to include concentration curves. For two given random variables a condition in terms of their concentration curves (with respect to themselves) is derived which is necessary and sufficient for second degree stochastic dominance between the variables.

1. Introduction. The last two decades have witnessed a revival of interest in the Gini coefficient and the Lorenz curve. Authors in different fields independently discovered the usefulness of the Lorenz curve, the concentration curve and the Gini coefficient. Atkinson (1970) showed that the rules for ordering risky prospects can be presented in a simple way by Lorenz curves (see Hadar and Russel (1969), Hanoch and Levy (1969), Rothschild and Stiglitz (1970)). These rules are referred to in the finance literature as *stochastic dominance rules.*

Atkinson's paper was followed by papers utilizing the Lorenz curve (and the Gini coefficient which is a summary statistic based on it) both in the field of finance and in the more traditional field of income distribution. In finance, rules were developed for ordering risky prospects utilizing the Gini index (Yitzhaki (1982)) and also for the evaluation of risky assets (Shalit and Yitzhaki (1984)). These rules are on the one hand similar to the classical rules using the variance (mean–variance rules, and capital asset pricing model, Markowitz (1952) and Sharpe (1964)), and on the other hand they rank prospects in accordance with the maximization of expected utility even when prospects are not normally distributed.

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