

## Diversification in Portfolio Selection Problems: A Definition and some Financial Consequences.

Mohamed TOUATI-TLIBA<sup>1</sup>

**Abstract:** The purpose of this article is to propose a general definition of « more diversified » in portfolio problems and relate this definition to the optimal investment strategy. Central to this concern is the identification of what it is that is diversified and what determine the desirable degree of diversification. Some partial diversification results are provided using both the general expected utility model for arbitrary distributions as well as standard parametric distributions suitable for portfolio theory emphasizing the role of different parameters in determining the degree of diversification. It is shown that if the random vector of returns  $Y$  is a mutual fund transformation of  $X$  then every risk averse investor diversify more under  $X$ . Furthermore, for elliptical and skew-normal distributions, necessary and sufficient conditions are given to insure that short sales are not the optimal investment strategy for all risk-averse investors. We also discuss the relation between relevant parameters of two distributions that imply more diversification under one distribution rather than the other.

**Key words:** Portfolio selection, Diversification, Majorization, Negative interdependence, Elliptical distributions, Skew-elliptical distributions, Separating distributions.

---

<sup>1</sup> Chargé de cours à l'Ecole Supérieure de Commerce d'Alger.

Parts of this paper is drawn from a proposal submitted and defended (April 1983) at the Graduate School of Business Administration, New York University in partial fulfilment of the requirements of Ph.D.

I wish to express my gratitude to David Nachman for his reading of and comments on the early proposal. The definition of “more diversification” and the mutual funds interpretation are his. I am also grateful to Jewel Owen for helpful discussions. Of course, any errors are my sole responsibility.