

One-sided performance measures under Gram-Charlier distributions

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Abstract

We derive closed-form expressions for risk measures based on partial moments by assuming the Gram-Charlier (GC) density for stock returns. As a result, the lower partial moment (LPM) measures can be expressed as linear functions on both skewness and excess kurtosis. Under this framework, we study the behavior of portfolio rankings with performance measures based on partial moments, that is, both Farinelli-Tibiletti (FT) and Kappa ratios. Contrary to previous results, significant differences are found in ranking portfolios between the Sharpe ratio and the FT family. We also obtain closed-form expressions for LPMs under the semi non-parametric (SNP) distribution which allows higher flexibility than the GC distribution.

JEL classification

C10; C61; G11; G17

Keywords

Lower/upper partial moment; Certainty equivalent; Rank correlation; Semi non-parametric distribution

1. Introduction

An adequate risk-adjusted return performance measure (PM) is essential for selecting investment funds. The Sharpe ratio (Sharpe, 1966; 1994) has become the benchmark PM by adjusting the expected excess fund return by the symmetric risk measure or standard deviation. Although this ratio is still a reference indicator for assessing the accuracy of investment strategies, its use becomes rather doubtful when the fund return distribution is beyond the class of elliptical distributions (Owen and Rabinovitch, 1983) that include the normal distribution. As a result, several one-sided type measures of risk have been proposed and the associated PMs are known as one-sided PMs. In fact, some of these PMs are also characterized by one-sided reward measures.

Some examples of one-sided PMs are the adjusted for skewness Sharpe ratio (ASSR) proposed by Zakamouline and Koekebakker (2009a), the Generalized Rachev family based on the conditional Value at Risk (Biglova et al., 2004), the Farinelli-Tibiletti (FT) family based