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## **Risk-Adjusted Performance Measurement of Bond Funds**

### Abstract:

Performance Measurement of Funds covers two major approaches, attribution analysis and alpha-measurement. Attribution analysis addresses the problem how to decompose the total return of a fund in market- and skill-driven components. The body of the theoretical and empirical literature deals with the determination of total risk-adjusted excess returns (alpha). There exist only very few articles that try to combine both approaches. To the best of our knowledge there is no published work that attacks this problem for bond funds.

There are two main reasons why despite the importance of bond funds their performance measurement is not covered widely in the academic literature. First, bonds change their risk-return characteristics as calendar time proceeds. Therefore, performance measurement has to be based on a dynamic model. Second, and equally important, properly risk-adjusted returns can be determined only if the terms of individual bonds in the fund and their volumes are known, as, e.g., the interest-rate risk exposure of a fund depends on the maturities of the individual bonds.

In our presentation we will cover the following topics. First, we will recall the basic problems related with attribution analysis for bond funds. In the second step we present an intensity bond model to determine the no-arbitrage relation between expected excess return and the portfolios current risk. From this reference model we derive two approaches to measure the total risk-adjusted return and the risk-adjusted return for individual return components. In the third step we will present the empirical results for risk-adjusted attribution returns and total excess returns of 11 bond portfolios which are actively managed. The empirical study covers the estimation of weekly term-structures of interest rates in the five-years period 1999-2003 of Government bonds, and AAA/AA, A and BBB rated public and corporate bonds. Subsequently, the parameters of a six-factor intensity model and the factors' market prices of risks are estimated. These results are used to determine the funds' performance for rating-maturity classes and the total risk-adjusted return.