

An Integrated View of Risk Management: Portfolio Allocation Incorporating Credit Risk

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Abstract—Markowitz (1952, 1959) first proposed a well-known mean-variance analysis for optimizing portfolio diversification that has been long served as a foundation of modern finance. The risk diversification was formulated by a quadratic optimization model. Unfortunately, the quadratic optimization had a computational difficulty in dealing with a large number of asset allocations. To enhance the computational capability, Konno and Yamazaki (1991) incorporated the concept of time into the mean-variance analysis and expressed the market risk by a variance of return in an absolute form. The risk diversification was formulated by goal programming and solved by linear programming. The computational issue is solved, indeed. However, both approaches consider only the market risk measured by a variance of return, but not paying attention to credit risk (e.g., bankruptcy). Furthermore, they do not pay attention to a fact that the market risk is expressed by Value-at-Risk (VaR). To overcome such methodological issues on risk management, this study explores how to incorporate both credit risk and market risk into a VaR model. The proposed approach is applied to asset allocation that is composed of stocks related to Japanese electric industry. The performance of the proposed approach is compared with the risk diversification model proposed by Konno and Yamazaki (1991). In the comparison, it is confirmed that the former performs at least as well as the latter in sluggish economy.

Keywords—Portfolio analysis, Credit risk, Market risk

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