

具有違約風險證券之最適投資組合策略

Optimal Portfolios with Default Risks

— A Firm Value Approach

摘要

關於 Merton (1969) 最適投資組合策略問題，所考慮之投資情境為：一個將其財富資金安排配置於風險性資產(各類證券)與無風險短期現金部位之投資人，在給定此投資人心目中財富效用函數之前提下，希望事先決定出投資組合之最適投資權重(策略)，藉此達成在投資期滿時極大化財富效用之期望值。基於 Merton (1974) 公司價值觀點，具有違約風險之證券(公司債與股票)乃是公司價值之衍生性商品，無法以傳統資產配置對股票與債券部位採取現貨方式處理最適投資策略，在此必需同時結合財務工程處理衍生性金融商品計價與避險之技術來解決。本研究利用 Kron & Kraft (2003) 彈性求解法來針對市場是否有投資限制、債券提前違約、到期違約及利率隨機與否等假設，基於不同投資組合情境分析來最適投資部位策略。本研貢獻和究創新突破之處在於特別探討公司違約時，債券投資人不再享有全部公司殘值之求償權，此時股東亦享有部份比例之求償權，違約後之公司殘值將由債券投資人與股東兩者比例共分之特殊情境下，對數型態財富效用之投資人對於提前違約風險之接受度高於到期違約風險，若一般情境(股東無任何求償權)則為相反。此外亦特別提供最適成長投資組合之動態避險策略封閉解，藉以提供投資人面臨企業違約風險時應制定之投資決策與動態調整，使本研究臻至週延與實用。

關鍵字：最適投資組合、信用風險、違約風險、彈性、存續期間

Abstract

Under the Merton (1969) optimal portfolio problem, we only consider the specific investor, whose wealth utility follows the type of logarithm function; wants to maximize the expected value of the terminal wealth utility through determine the optimal investment strategy in advance. He divides his wealth into the riskless asset and risky assets such as the money market account and the various-risky securities issued by the corporate.

Based on the Merton firm value framework (1974), the defaultable securities, such as the corporate bonds and stocks, are the derivatives instruments of the firm value. It will be inappropriate if we deal with this optimal portfolio problem under the original methods. Therefore, we need to handle this optimal asset allocation problem through the pricing, valuation and hedging techniques from the financial engineering simultaneously.

This study apply the elasticity approach to portfolio optimization (EAPO, Kraft ,2003) to solve the optimal portfolio strategy under various scenarios, such as the market contains the investment constrain or not, intermediate default risks, mature default risk, interest rate risky under the stochastic process.

The innovation and contribution of this paper are especially breaking the common setting and analysis the optimal-growth-portfolio strategy under the special scenario. In the common setting, as soon as the default event occurs, the residual firm value will be claimed by the corporate bondholders with fully proportion and the stockholder cannot share any residual value. Oppositely, the stockholder will be able to share the residual firm value proportionally with the corporate bondholder together under the so-called special scenario. We found that the investor would have higher acceptance of the premature default risk than the mature default risk in the special scenario. This phenomenon will be reversed under the common scenario.

Furthermore, in order to make this study more completely and useful, we do not only illustrate the optimal investment strategy but also provide the closed-formed solution of the dynamic hedge strategy of the risky position, composed by the defaultable securities. This could help the optimal-growth-portfolio-oriented investor to make investment decision while they face the firm value downward decreasing.

Keywords: optimal portfolios, credit risk, default, elasticity, duration,