

## 5 Conclusion

In this paper, we investigate the asset allocation problem for defined contribution pension fund which considers not only the market risk and interest risk but also the uncertainties from labor incomes, the inflation risk and the management charges. We find that if the pension fund is to maximize the expected exponential utility of its terminal wealth, then there should be five components in its optimal asset allocation. Therefore, the optimal investment behaviors of the pension fund managers are characterized through the relative weights among the separated mutual funds according to their preference, financial market and the influential factors.

In this study, we investigate the optimal asset allocation problem incorporating both the financial and background risks. Pension fund managers must consider the short-term fund performance and the hedge requirements simultaneously. Since there exist background risks that cannot be controlled by the fund managers, a comprehensive dynamic framework is formulated to describe the decision-making process. As our results show, the dynamic portfolio that maximizes the expected utility of the plan participant consists of five components: the market portfolio, the state variables hedge portfolio, the inflation hedge portfolio, the salary uncertainty hedge portfolio and the riskless asset. By explicitly solving the optimal portfolio problem, the numerical results indicate that the inflation hedge portfolio constitutes the overwhelming proportion of stock in the optimal portfolios. In addition, the inflation hedge portfolio and the state variable hedge portfolio constitute the overwhelming proportions of bond holdings. This shows that long-term investors should hedge inflation rate risk by holding the stock index. In addition, these investors should respond to the intertemporal hedging demands in the financial markets by increasing the average allocation to their bond fund.

To understand the roles of these components, it is necessary to explore the economic interpretations by solving the dynamic optimization problems. With respect to the most common approach used in the literature, the incorporation of the labor income and inflation risks allows us to characterize the general pattern of the optimal strategy.