Optimal portfolio allocation for an investor with insurance risk and differential rates

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We study a continuous-time optimal asset-allocation problem for a firm in the insurance industry that backs up the liabilities raised by the insurance contracts with the underwriting profits and the income resulting from investing in the financial market. Unlike most existing related results in the literature, we assume the firm can decide the number of policies held in the portfolio of insurance contracts. Using the martingale approach and convex duality techniques we find explicit portfolio proportions and liability ratio that maximize expected utility from final wealth under CRRA preferences in presence of non-linear wealth dynamics due to differential interest rates for borrowing and lending.