

**Maximizing investment returns of insurance company while  
minimizing the probability of ruin.**

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In this dissertation we take the risk reserve of an insurance company to Brownian motion with drift and tackle an optimal portfolio selection problem of the company. There are two investment cases we consider in particular. First case is where the company has only one investment opportunity, a risky asset and focus is on obtaining investment strategies that are optimal in the sense of minimizing the risk of ruin. In particular we solve for the strategy that maximizes the probability of achieving given upper wealth level before hitting a given lower level. This policy also maximizes the probability of survival. We prove that when there is no risk-free interest rate that is when investment is only in the risky asset, this policy is equivalent to the maximize utility from terminal wealth, for the fixed terminal time when the company has the power utility. Similar results were obtained by Browne (1995) for the firm with exponential utility. The second case is when the company can invest in both a risky asset and risk-free asset, in the case we show that the policy that maximizes the expected utility is not equivalent to the policy that maximizes the risk of ruin. We establish that, the company is to maximize the risk of ruin. We establish that if the company is to maximize the risk of ruin, then policy invest more in the risk-free and less in the risky asset as the wealth level increase. We also show that it is not possible to maximize expected power utility for an investor with a random cash flow (insurance company)