A Comparative Study to Find the Optimal Ordering Quantity of the Risk-Neutral and Risk-Averse Newsvendor

Mahadev Ota[1], Dr.Varun Mohan[2]

[1] Department of Mathematics & Actuarial Science, B S Abdur Rahman Crescent Institute of Science & Technology, Chennai-600048, Tamilnadu, India
[2] Associate Professor Department of Mathematics, Sharda University, Greater Noida, UP, India

ABSTRACT

In the classical newsvendor problem, it is considered that the newsvendor is risk-neutral and the Optimal Ordering Quantity (OOQ) was found which maximizes the newsvendor expected profit. In the real world, different investors have a different attitude towards risk. Accordingly, this paper considers the utility function which is commonly being used to model the attitude of the investor who makes the investment decision so as to maximize his expected utility instead of expected profit. This study considers the quadratic utility function and demonstrates that it can be used to describe the risk averse as well as risk neutral investor with some conditions. Finally, by considering the risk profile of the investor at different levels of investor's initial wealth, we have developed a method to determine the OOQ which maximizes the expected utility. From the numerical examples, it is clear that the OOQ and hence the expected utility varies depending on an investor's attitude toward the risk and investment decision. At different levels of initial wealth, the attitudes toward risk of the investors are different and the sensitivity analysis demonstrates how an investor can choose the initial wealth and OOQ to maximize his expected utility.

Keywords: optimal ordering quantity, risk-neutral, risk-averse, expected utility, initial wealth, salvage value