

# Effects of Factors on the Market Price of the Shares Using Design of Experiment

Amir Ahmad Dar<sup>1,\*</sup>, Mohammad Shahfaraz Khan<sup>2</sup>, Imran Azad<sup>2</sup>, Tanveer Ahmad Tarray<sup>1</sup>, N. Anuradha<sup>3</sup>, Qaiser Farroq Dar<sup>4</sup>, and Bilal Ahmad Chat<sup>1</sup>

<sup>1</sup>Department of Mathematical Sciences, Islamic University of Science and Technology, Pulwana, India

<sup>2</sup>Department of Business Administration, University of Technology and Applied Sciences, Salalah, Oman

<sup>3</sup>GITAM School of Business, Gandhi Institute of Technology and Management, Visakhapatnam, India

<sup>4</sup>Department of Health Research, ICMR-National Institute of Research in Tribal Health, Jabalpur, India

Received: 23 Jan. 2023, Revised: 30 Jan. 2023, Accepted: 15 Feb. 2023

Published online: 1 May 2023

**Abstract:** When the cost of capital, dividends and the price of the share at the beginning is known, Modigliani and Miller's model can be used to estimate the price of the share at the end of the period. A design of experiment (Taguchi's orthogonal array) is used in order to investigate the impact of three parameters on the price of the share at the end of the period. The main aim of this research article is to find which parameter is more significant on the price of the share at the end of the period. Taguchi's methodology of design of the experiment is used for the experimental setup and to optimize the factors for the value of shares. In this study, the optimal combination of input factors is sought for the first time using the Taguchi method. To explore the effects of input factors, the Taguchi method L9 design of experiment (DOE), analysis of variance (ANOVA), regression analysis, and analysis of mean (ANOM) are used and the analysis is carried out using MINITAB 18 software. The ANOM is used to check the best optimal combination among the parameters where the value of the share is maximum, also it measures which parameter impacts more on the price of the share at the end of the period. ANOVA is used to measure the percentage contribution of each parameter on the price of the share.

**Keywords:** Modigliani and Miller's model, Taguchi Method, ANOM, ANOVA, Share price

## 1 Introduction

Almost all research begins with an experiment to try something new that the researcher is interested in. An experiment's primary goal is to draw conclusions about the population being studied. When conducting a statistical investigation, a researcher aims for reliable and useful findings. Creating an experimental setting that allows for a more accurate exploration of the hidden characteristics of a population is necessary to uncover the characteristics of a population that are hidden from view, such as the impact of several factors on a certain response variable.

The use of the DOE technique enables experiments to be conducted economically, from data collecting to the identification of the investigation's main goals and conclusion-making. Its goal is to collect data that statistical tools can analyse for the best/maximum output.

Sir Ronald Fisher introduced the DOE approach in his ground-breaking publications (the arrangement of field experiment, 1926 and the DOE, 1935 [1,2]). His significant contribution made it possible for the researchers to combine numerous components and an ANOVA [3]. The study examined agricultural productivity with the goal of examining multiple influences on it at once. He calculated the amount of light, fertiliser, water, and other resources required to produce exceptional agricultural output. Numerous studies have been conducted on the use and development of DOE since the notion was first proposed.

The Taguchi approach, developed by G. Taguchi in the 1940s, is one of the greatest techniques for minimising the number of orthogonal arrays (OA)-based trials because it gives the researcher significantly less variance for the experiment when the control input parameters are set to their ideal values [4]. To reduce the number of trials, Taguchi employed a partial factorial

\* Corresponding author e-mail: [sagaramir200@gmail.com](mailto:sagaramir200@gmail.com)