

## Abstract

Index tracking aims to create a portfolio with a similar performance to the reference index using fewer stocks. Concerning index-tracking, the ability to map data sources in the form of investment return data, economics, or financial reports to predict investment return is essential. The promising method to accomplish it is deep learning. This study investigates the use of deep learning for portfolio index-tracking using LQ45 as the reference index. Autoencoder and Deep Neural Network are two Deep Learning techniques; Autoencoder is utilized for stock selection, and Deep Neural Network handles portfolio optimization index-tracking. Two weighting techniques are used to create a portfolio: the Correlation Coefficient and Equal- Weight. The result shows that portfolio index-tracking produced by this research has similar performance and even exceeds LQ45 performance, as demonstrated by the resulting error of less than 0.03. Finally, despite the risk of the index-tracking portfolio that is slightly higher than LQ45, however, the performance shown by the Deep Learning implementation is considered promising as, in some circumstances, the method shows lower error compared to other similar research. Therefore, it is then expected that the Deep Learning implementation is able to contribute significantly to optimize portfolio index-tracking, especially for LQ45.

**Keywords:** *index tracking, deep learning, portfolio, autoencoder, deep neural network*