

I. INTRODUCTION

One of the main problems in financial market analysis is predicting stock price movements, especially on the Indonesia Stock Exchange (IDX). Using historical data and fundamental ratios of companies, this research concentrates on building a Temporal Convolutional Network (TCN) based prediction model to divide stock price movements into three categories: up, stagnant, and down. The purpose of this research is to find out whether adding company fundamental features can improve the accuracy of the prediction model compared to using only the essential feature, which is the stock's closing price.

Using TCN, Wei Dai et al. [1] developed an accurate stock price change prediction model using data from stock transactions in the Shenzhen Stock Exchange 100 Index (SZSE 100) in China. In predicting high-frequency stock prices, which show real-time market changes, TCN proved better than traditional models such as Generalized Autoregressive Conditional Heteroskedasticity (GARCH) and Long Short-Term Memory (LSTM). Although on some indicators, TCN is slightly inferior to GARCH and has a higher recall rate for category A and C stock price classification. In addition, TCN, which integrates the attention mechanism in its architecture, offers more accurate predictions of financial securities. Research by Chun-Xia Zhang et al. [2] also demonstrated the superiority of TCN in financial risk management and stock market trend prediction where TCN not only outperforms traditional GARCH models but also deep learning methods such as LSTM in predicting stock volatility and Value-at-Risk (VaR), which helps investors understand the maximum potential loss and make smarter investment decisions.

Research by Yuxuan Huang, Luiz Fernando Capretz, and Danny Ho (2022) also used fundamental data analysis for stock prediction, where they compared algorithms such as Feed-forward Neural Network (FNN), Random Forest (RF), and Adaptive Neural Fuzzy Inference System (ANFIS). The results of this study show that the RF model is the most accurate, and feature selection can improve the performance of the FNN and ANFIS models [3]. Moreover, Ma et al. (2019) conducted an empirical study on the relationship between financial ratios and stock prices in China using linear regression and correlation analysis. They focused on three different industries: media, energy, and steel. The results showed that fundamental analysis can be effectively used as an investment tool in the context of a transitional economy such as in China, and accounting information can reflect economic reality well because financial statements in each industry can partially reveal stock value information according to the economic situation of the industry [4].

Previous research has shown that TCN is effective in predicting stock prices through classification [1]. In contrast to these approaches, this study aims to evaluate whether the addition of company fundamental features, such as Debt to Equity, PBV, and PE ratios, can improve the accuracy of the prediction model compared to using only historical closing price data. This study uses weekly stock data from companies listed on the Indonesia Stock Exchange (IDX), thus providing a focus on the characteristics of the Indonesian stock market. The results of this study are expected to not only make a significant contribution to the development of more accurate stock prediction models but also become a useful reference for investors to make more strategic investment decisions, such as reducing the risk of loss and increasing the potential for profit based on more comprehensive data analysis.