CHAPTER 1
INTRODUCTION

1.1 Overview of Research Objects

A stock index is a statistic that indicates changes in price or a collection of stocks based on specific standards and procedures that are reviewed on a regular basis. The LQ45 is one of the stock indices that is traded on the Indonesia Stock Exchange (IDX). The LQ45 (liquid 45) index represents the share prices of 45 Indonesia Stock Exchange (IDX) issuers that were chosen based on the greatest liquidity standards, the largest market capitalization, and the highest trading volume.

According to Situngkir & Batu (2020) , the companies chosen for the LQ45 Index Price category are firm shares that met the requirements for the highest liquidity, biggest market capitalization, most frequent trading, and stable financial conditions.The LQ45 index is not a fixed index, but is subject to change every six months depending on developments. The IDX also evaluates the performance of stocks on the LQ45 Index and assigns an appropriate rating. This proves that competition in the LQ45 index is high because if a company cannot maintain the stability of the issuer, then its position will be replaced by another company.

In February 1997, the LQ45 index was initially introduced. On the other hand, this stock index was introduced on July 13, 1994, with an index value of 100, according to all available historical data. The LQ45, which has stronger selection criteria to ensure that only the best-performing companies are included in this index, was introduced by the IDX in 2007. To reflect the performance of the greatest firm stocks listed on the Indonesia Stock Exchange, the LQ45 index is crucial for investors and capital market specialists to monitor.

1.2 Research Background

The capital market is a financial instrument that has an important role in a country's economy. The capital market serves the purpose of distributing capital or resources from financiers or investors to those who require capital or resources. Stock, a representation of corporate ownership, is one of the more well-known capital market tools. Compared to other instruments, shares have the most potential for profit and are the most liquid. The owners of shares receive a number of advantages, including dividends, capital gains, and voting rights at the annual shareholders meeting (GMS). Financial policies, which include investment decisions, financial leverage, and dividend policies, can have an impact on a company's value (Gustyana et al., 2021).

Stock investment is a popular type of investment and is in great demand by the public (Sudarmanto et al., 2021). The stock index is one metric used in stock investment. A stock index is a statistic that indicates changes in price or a collection of stocks based on specific standards and procedures that are reviewed on a regular basis. The LQ45 is one of the stock indices that is traded on the Indonesia Stock Exchange (IDX). The stock prices of 45 issuers listed on the Indonesia Stock Exchange are reflected in the LQ45 (Liquid 45) index (IDX). The chosen issuers are chosen after taking into account a number of factors, including the highest liquidity and the largest market capitalization.

The LQ45 index, one of the primary stock indices on the Indonesian Stock Exchange, comprises of 45 equities that have been carefully chosen for their high liquidity, market capitalization, and volume of transactions. The primary indicator used to assess the performance of the Indonesian capital market is the LQ45 index. With numerous economic and political developments affecting stock price swings on the Indonesia Stock Exchange between 2010 and 2019, the LQ45 index had some quite large fluctuations.

Figure 1.1

LQ45 Index Price

Source: TradingView, 2023

The LQ45 Index started the year at 529.83 and peaked on November 5, 2010, at 692.64. Due to the European crisis and rising global oil costs, which had an impact on the state of the world economy in 2011, the LQ45 index declined precipitously in 2011. Due to economic policies that encouraged industrial expansion in Indonesia in 2012, the LQ45 index increased once more. Due to government initiatives that encouraged economic expansion in 2013 and 2014, the LQ45 index kept rising. (as shown by figure 1.1)

However, the LQ45 index once more suffered large changes in 2015–2016 as a result of things like declining commodity prices and government regulations regarding foreign investment. Due to the global economic recovery and the stabilization of commodity prices in 2017–2018, the LQ45 index increased once more. The LQ45 index, however, once again suffered oscillations in 2019 as a result of things like the trade war between the US and China and the political upheaval in Indonesia.

Overall, from 2010 to 2019, there were quite a few swings in the LQ45 index, which were impacted by a variety of domestic and international economic and political events. Thus, in order to forecast future changes in stock price, it is crucial to analyze the variables that affect the movement of the LQ45 index.

Macroeconomic factors can be used as a factor influencing stock price changes in LQ45 stock index projection. Internal debt stock, credit volume, exchange rate, gold prices, money supply, interest rate, and industrial production index are common macroeconomic factors considered in this analysis. In general, Indonesia's macroeconomic circumstances have a significant impact on how the LQ45 Index Price fluctuates. The forecasting study of the LQ45 Index Price must take into internal debt stock, credit volume, exchange rate, gold prices, money supply, interest rate, and industrial production index.

Internal debt stock, commonly referred to as domestic debt, is the total amount of debt that a nation's government or domestic private sector has issued. The stock of internal debt in Indonesia is a significant macroeconomic element since it has the potential to impact the country's economic health. The quantity of domestic debt in Indonesia has increased between 2010 and 2019. The total amount of domestic debt in Indonesia was Rp 1,435.4 trillion at the end of 2010, and Rp 3,979.3 trillion at the end of 2019 (Bank Indonesia, 2019). The government's attempts to fund infrastructure improvements and support the Indonesian economy are consistent with the rise in domestic debt stock.

The amount of credit in Indonesia increased significantly between 2010 and 2019. Bank Indonesia data show that the amount of loans disbursed by Indonesian banks grew from IDR 1,557.9 trillion in 2010 to IDR 5,327.2 trillion in 2019 (Bank Indonesia, 2019). This demonstrates that Indonesia's banking industry is quite robust and capable of offering enough finance for the country's numerous economic sectors. Nevertheless, this rise in lending volume also had a drawback—namely, it put institutions at greater danger of default.

Due to different internal and external variables, Indonesia's currency rate varied often between 2010 and 2019. The state of the international economy, notably the global financial crisis in 2008 that had an impact on economies all around the world, was one of the main external variables. Moreover, changes in the monetary policies of significant trading partners like the US and China have had an impact on the currency rate in Indonesia. The Indonesian rupiah varied between IDR 8,537 and IDR 14,685 per US dollar between 2010 and 2019, according to

(Bank Indonesia, 2019) the nation's national bank. November 2018 saw the highest exchange rate, while December 2010 saw the lowest. The US taper tantrum in 2013, the Greek debt crisis in 2015, and the China-US trade war in 2018 are just a few of the noteworthy events that had an impact on the exchange rate during this time.

The price of gold fluctuated significantly between 2010 and 2019 from approximately US$ 1,100 per ounce in 2010 to a high of US$ 1,895 per ounce in 2011, then down to about US$ 1,050 per ounce in 2015 before rising once again in 2019 to about US$ 1,450 per ounce (World Gold Council, 2020). Given that Indonesia is the world's second-largest supplier of raw gold after China, fluctuations in gold prices occasionally have an effect on Indonesia's trade balance. Indonesia had a $4.44 billion deficit in its gold trade balance in 2015 as a result of falling gold prices. Yet in 2018, when gold prices started to increase, Indonesia was able to produce a $5.8 billion gold trade surplus. Furthermore, because gold plays a significant role in Indonesia's foreign currency reserves, the price of gold also affects the country's foreign exchange reserves. By the end of December 2019, the majority of Indonesia's foreign exchange reserves, or around 8.7% of its total reserves, were made up of US$ 31.6 billion in gold Bank Indonesia (2019).

Money supply in Indonesia significantly increased from the beginning of the 2010-2012 era, rising from about IDR 3,000 trillion in 2010 to almost IDR 4,700 trillion by the end of 2012 Bank Indonesia (2013). This happened as a result of the monetary easing strategy adopted by BI to boost economic development and preserve price stability. Nonetheless, BI started to decrease the amount of money in circulation in the 2013–2014-time frame by increasing the benchmark interest rate. To combat growing inflation and maintain the rupiah currency rate, this was done. The Money Supply increased significantly between 2015 and 2017, reaching over IDR 6,800 trillion at the end of 2017 (Bank Indonesia, 2018). This resulted from the monetary easing program implemented by BI to spur economic development in the midst of a still-fragile global economy. The amount of money in circulation in Indonesia peaked at about IDR 8,400 trillion at the end of the 2010–2019 period (Bank Indonesia, 2019). The intricacy of Indonesia's economic situations, which were impacted by external variables and BI policies adopted to preserve economic

stability, was highlighted by the significant swings in the money supply throughout this time.

The BI 7-day Reverse Repo Rate is the reference interest rate that Bank Indonesia uses in Indonesia (Bank Indonesia, 2019). This benchmark interest rate had several significant swings between 2010 and 2019. The benchmark interest rate was 6.5% in the beginning of 2010. The benchmark interest rate was then increased by Bank Indonesia to 7.5% in 2013. To combat the economic slump at the moment, Bank Indonesia reduced the benchmark interest rate to 6.75% in 2015. Interest rates significantly affect the movement of the stock index, according to several research. (Vikaliana, 2017) study found that interest rates significantly and negatively affect Indonesian stock indices. This implies that the stock index will decline when interest rates rise and vice versa.

Data shows that from 2010 to 2019 Badan Pusat Statistik (2019), the IPI in Indonesia tends to increase significantly. In 2010, Indonesia's IPI reached 109.7 and increased to 129.7 in 2019. However, in certain years, such as in 2015 and 2016, IPI experienced a significant decline due to difficult global economic conditions. Factors influencing IPI in Indonesia include domestic demand and international demand, as well as government policies related to industry. An increase in IPI can have a positive impact on economic growth, such as increasing investment and employment.

In previous research by Caramp et al., (2022) this studies the implications of trading frictions in financial markets for firms' investment and dividend choices and their aggregate consequences. The main result is that when equity shares trade in frictional asset markets, the firm's problem is time-inconsistent, and the empirically relevant direction of inconsistency is present bias.

Other research by Zhang (2019) propose a general framework of optimal investment and a collection of trading ideas, which combine probability and statistical theory. They found simulation and backtesting studies show good performance of selected trading strategies under the proposed framework. Research by Shen et al. (2022) measure the impact of digital finance on the investment behavior of Chinese households in risk finance assets. revealed that the adoption of

digital finance will increase the number of people investing in risky assets as well as the share of households doing so. Research by Rizal et al. (2018) reduced form model for credit risk, market risk (deterministic rate of return and inflation risk), and optimum investment with a defaultable corporate bond. From the simulation and sensitivity analysis of the finding model that the utility and weight of the assets are calibrated correctly based on the behavior of the exponential function and also have the same interpretation as how the investor would act.

In previous research by Nurmansyah & Thamrin (2022) shows that macroeconomic variables, such as the exchange rate, inflation, Gross Domestic Product (GDP), SBI rate, and money supply from the results of the Impulse Response Function and Variance Decomposition, the SBI rate are variables that provide the most significant contribution to the LQ45 stock Index Price. This means that in the long run Gross Domestic Product cannot be used to predict the LQ45 Index, which means public awareness to invest in the capital market during 2016-2020 is still low.

Other research by Hamzah et al. (2021) this study uses a straightforward linear regression analysis method to look at the impact of macroeconomic factors on the LQ45 stock index on the Indonesia Stock Exchange from January 2012 to December 2016 including the rupiah exchange rate against the US dollar, the BI 7-day reverse repo rate, and inflation. The outcomes indicated that the LQ45 stock index on the Indonesia Stock Exchange was highly impacted by the rupiah exchange rate versus the US dollar, the BI 7-day reverse repo rate, and inflation. Other research by Putri & Rizal (2019) comparing inflation, currency exchange rates, gold and oil prices from 2012 to 2016, the Jakarta Islamic Index will be used. It was done using monthly data from January 2012 to December 2016. The study's conclusions indicate that concurrent fluctuations in inflation, currency exchange rates, gold prices, and oil prices had a substantial impact on the Jakarta Islamic Index stock Index Price from 2012 to 2016 in terms of its performance.

In previous research by Weng et al. (2022) this study analyzes the return on investment (ROI) of Apple and Tesla at the beginning, demonstrating that Tesla's ROI is significantly higher than Apple's, before concentrating on the naive approach

and ARIMA model used to forecast time series data to the study's findings, Tesla's stock price exhibits an increasing tendency and has a particular investment worth when compared to Apple's stock price and forecasting models. Nevertheless, predictive algorithms can only identify the general trend and are unable to forecast with accuracy the exact trajectory of stock prices. Other research by Wibowo et al., (2022) to predict 30 days ahead of Unilever Indonesia stock price and Telekomunikasi Indonesia stock price using time series analysis and machine learning in R, time series forecasting. the final results that have been compared show that using the ARIMA and neural network methods produces good accuracy values. The data model used to predict close stock prices in this study Unilever Indonesia using ARIMA has an accuracy of 98.87%. and using neural network model has an of 98.92%.

Research by Devianto et al. (2020) this study use modeling the composite stock Index Price by using the Artificial Neural Network (ANN) and nonparametric regression of Multivariate Adaptive Regression Spline (MARS). With its predictor variables are crude-oil prices, interest rates, inflation, exchange rates, gold prices, Dow Jones price, and Nikkei 225 Index. In order to provide an alternative to forecasting the Indonesian composite index in the future, time series modeling employing ANN and nonparametric MARS regression approaches has been developed.

Other research (Bağcı & Çıtak, 2020) have already conducted research on this empirical study uses the Multivariate Adaptive Regression Splines (MARS) Model to forecast the macroeconomic factors that would affect the Istanbul Stock Price (XU100) in Turkey from January 2010 to December 2019 Inflation rate, gold prices, industrial output index, money supply, exchange rate, credit volume, and internal debt stock are all clearly significant factors influencing the price of the XU100, according to their research. In addition, with the relevance value of each percentage of internal debt stock, credit volume, exchange rate, it has a relevance value of more than 50% which makes it the most significant indicator 100.00, 59.70, 58.20, and for the price of gold, the money supply, interest rates have a relevance

value of more than 20 percent 49.95, 26.88, 24.55 and the last for the Industrial Production Index and has very low relevance value by having 11.32 percent.

Because Bağcı & Çıtak, (2020) publication incorporates more macroeconomic data than other studies, the researcher chose to make it a reference journal. The publication also offers tried-and-true research procedures, confirming the legitimacy of my findings. From the description above, the author is interested in further researching on another period of time which is during the 2010-2019 period, entitled **"FORECASTING LQ45 INDEX PRICE USING MACROECONOMIC VARIABLES OF BAĞCI AND CITAK UNDER MACHINE LEARNING PREDICTION"**

1.3 The Problem Statement

The formulation of the problem to be discussed in this research is:

1. What is the prediction of LQ45 index price using macroeconomic variables of Bağcı and Citak model under machine learning prediction?
2. How robust is the prediction price model to the actual data?

1.4 Research Purposes

The objectives of this research are as follows:

1. To analyze the prediction of LQ45 index price using macroeconomic variables of Bağcı and Citak under machine learning prediction.
2. To investigate the robustness of the price prediction model of LQ45 index perform effectively to the actual data.

1.5 Benefits of Research

Based on the research questions above, the research objectives can be taken as follows:

1. This research is expected to be able to add to knowledge, references, and literary literature Forecasting LQ45 index price Using Macroeconomic Variables of Bağcı and Citak Under Machine Learning Prediction for the 2010-2019 Period.

2. This research is expected to provide information to investors and potential investors what they want to invest, so they can pay attention various factors that can have an impact on the return of the LQ45 Index Price.

1.5.1 Academic Benefits

The findings of this study should provide readers with information and knowledge about forecasting LQ45 index price using macroeconomic variables of Bağcı and Citak under machine learning prediction for the period (2010-2019).

1.5.2 Practical Benefits

The practical benefit of research is that it can be a place to apply theories that occur in the field and become a consideration for future researchers. Become a source of information and knowledge for readers about the impact of forecasting LQ45 Index Price using macroeconomic variables of Bağcı and Citak under machine learning prediction for the period (2010-2019).

1.6 Scope of Research

Purposive sampling is a sampling technique used in this research. This study focuses on forecasting LQ45 Index Price using macroeconomic variables of Bağcı and Citak under machine learning prediction for the period (2010-2019).

1.7 Writing System

CHAPTER I INTRODUCTION

This introductory chapter contains the background which is a description of the author's main idea or the reason why the author took the theme, then there is the formulation of the problem, namely the research design that will be studied from the background and topics that have been discussed. selected, and there are research objectives and benefits that serve as guidelines to be realized, and finally the systematics of research writing are described.

CHAPTER II LITERATURE REVIEW

In the literature review chapter, there is a theoretical basis from previous research which is used as a guide in writing this research. From the theoretical basis, it is used as a reference for making a framework of thought and hypotheses that will be tested.

CHAPTER III RESEARCH METHODS

Chapter 3 contains descriptions of operational definitions and variables used in research, types of research, place and time of research, research objects, sources and research, data analysis techniques and checking data validity.

CHAPTER IV RESULTS AND DISCUSSION

This chapter contains research data by describing the results of data analysis from research that has been carried out and discussing the results of the analysis. Interpretation results are obtained from research that has been carried out by researchers.

CHAPTER V CLOSING

The closing chapter contains conclusions, implications and suggestions given by researchers to various parties involved in this research. This chapter also contains the limitations of this research so that future research can be done better and more completely.