The Impact of Macro-Microeconomic Factors on Stock Price of Islamic Bank Listed on IDX

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All investors must conduct a company analysis before to making any investments. Investors, however, also need to take into account the local economic trends. This has become a requirement for all Muslims worldwide and is done in order for the invested assets to become more productive and deliver the most benefit. This study intends to determine how macroeconomic and microeconomic variables (ROA, ROE, inflation, and GDP) affect the stock prices of Islamic bank listed on the IDX over a time period spanning 2016 to 2020 using the VAR/VECM method. The result show that there is no short-run correlation between any of the micro and macro variables, according to the results of the Vector Error Correction Model (VECM) test. On the other hand, there is a long-run correlation between the stock prices of Islamic Banks listed on the IDX and micro factors (ROA and ROE). In contrast to the ROA variable, Return on Equity (ROE) actually has a long-term negative impact on stock prices. Return on Assets (ROA) has a positive long-term impact on company prices. The ROE variable, regardless of the influence, whether it be positive or negative, makes the biggest percentage contribution to stock prices, followed by ROA, IPI, and then CPI.

Keywords: Sharia bank; ROA; ROE; CPI; IPI; Stock Price

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INTRODUCTION

The Indonesian bank has gone through periods of organizational development. There have been no regulations defining clear norms for banks since 1980. Only state-owned banks, known as Bank of Indonesia Liquidity Loans, are permitted to broker their loans. Because the procedure is complicated, people are more likely to invest their money in metal. Prior to 1990, legal certainty reigned in the banking industry, as enshrined in Law No. 7. The MUI Banking Team's efforts led to the foundation of Indonesia's first Islamic bank, PT. Bank Muamalat Indonesia (BMI), which, according to its deed of establishment, was founded on November 1st, 1991. Since 1992, public trust in banks has begun to build, private banks have been founded or are in the process of being established, and a banking health system has been established. The banking sector is critical to a country's economy since it serves as a commerce artery that attempts to meet all types of financing and lending demands (Sufian, 2011). Banks have a significant role in a country's economy. The bank, as an intermediary entity, serves as a conduit for funding, storage, and lending, with the goal of improving people's lives.

According to Ikrima & Dahlifa, (2020) the growth of Islamic banks in Indonesia is considered to have accelerated since the implementation of Law No. 21 of 2008 Concerning Islamic Banking. This law is substantive and complies with Sharia (Sharia compliance). The Indonesian Scholars Council (MUI) owns the relevant authority, which is then granted to each Sharia Commercial Bank and Sharia Business Unit by the Sharia Supervisory Board (DPS). Beck et al., (2013) also stated that Islamic commercial banks ownership of the whole banking sector's assets increased by almost three times, from 1.6 percent in 2007 to 4.4 percent in 2012. The assets of Islamic commercial banks are continuing to increase, according to a report issued by the OJK, the total assets of Islamic banks were Rp. 254.184 trillion in 2016 and would continue to rise through the end of December 2020, totaling Rp. 397.09 trillion. This implies that the value of Islamic commercial banks increased by 3.5 percent between 2016 and 2020.

Bursa Efek Indonesia (BEI) is the name of the country's capital market in Indonesia. Due to the merger of BRIS, BNIS, and BSM to form Bank Sharia Indonesia (BSI), there are currently 12 Sharia Commercial Banks in Indonesia, reduced from 14 Sharia Commercial Banks previously. Currently there are 4 Islamic commercial banks that have registered their companies in IDX, these banks include Bank BTPN Sharia, BRI Sharia (which has since merged with BSM and BNIS to form Bank Sharia Indonesia, or BSI), Bank Aladin Sharia and finally Panin Dubai Sharia Bank. Only the four Islamic banks have had their businesses listed on the IDX thus far. The first Islamic bank to be listed on the IDX is Panin Dubai Sharia Bank, however Bank BRI Sharia and Bank BTPN Sharia have also been registered since 2018. Aladin Sharia Bank, meanwhile, has just comparatively recently been listed on the IDX.

To become a public company in the capital market, a company must do a public offering. Public offering refers to an issuer's action while making a public offering of securities in accordance with the guidelines established by Law No. 8 of 1995 Concerning the Capital Market (UUPM). The term "Listed Company" refers to an Issuer or Public Company whose securities are listed on the IDX, according to IDX Regulation No. I-A 2018. Therefore, it is extremely likely that even when a corporation is publicly traded, the Exchange does not list its securities.

Several regulations concerning the capital market and share ownership were issued by OJK as the supervisory party during its implementation. POJK No. 56, issued in 2017, discusses the limits of the Bank's share ownership for each category. With the existence of potential consumers for Sharia Banks in Indonesia (the majority of the Indonesian population is Muslim), this POJK seeks to strengthen the role of investors in national development by accommodating the dynamics and expectations of Non-Bank Financial Services Institutions and taking into account the fulfillment of investment limits in banks.

In 2021, however, OJK issued POJK No. 3/2021, which aims to improve investor protection and public trust. The presence of POJK 3/2021 has become the capital market's rules of the game, replacing Government Regulation No.45/1995 on similar matters, which is no longer in accordance with current industry conditions. One of the key provisions of this regulation is the provision for converting a public company to a closed company.

Internal factors such as ROA, and ROE are factors that can be used as a benchmark for the performance of an Islamic bank that could also affect stock price. Because of internal circumstances, the bank's condition and performance while performing its functions as an intermediary institution are described. However, using only the internal factors like ROA, and ROE are pretty much insufficient to evaluate performance of the Bank Sharia listed on the IDX.

According to Hasan et al., (2019) it is not sufficient to analyze a specific stock using just one component when utilizing the Capital Asset Pricing Model (CAPM) method since shares that have been listed on the IDX can be impacted by multiple factors, both internal and external. Which means, the condition of a stock price could also be significantly impacted by external circumstances such as, GDP and Inflation Rate.

With the above background, this study plans to examine both internal and external factors and their influence on fluctuations in the share price of Islamic banks listed on the IDX from 2016 to 2020. Return on Equity (ROE) and Return on Assets (ROA) are internal variables used. While the Inflation Rate and Gross Domestic Product (GDP) are considered as external variables.

The ROA variable was chosen because it demonstrates how a business produces profit from the operational performance of its assets and because it theoretically has a relationship with a bank's stock price. For stock investors who actually invest to make money, this is quite important. The ROE variable, however, considers the same factors as the ROA variable, and investors can still use it to assess a company's profitability even though in its application the ROA variable might better explain the overall results of the company's performance in creating profits. According to a hypothesis known as the variable inflation rate, costs for goods and services tend to rise over time, causing changes in the economy. The GDP variable was selected with the presumption that rising income can enhance a person's likelihood of making investments, including stock investments.

Based on the background of study above, it can be extracted several research questions, those are: (1)Does ROA, ROE, Inflation Rate, and GDP influence the stock price of Sharia Bank listed on IDX? (2)How long does the transmission of variable ROA, ROE, Inflation Rate, and GDP affect the share price of Sharia Banks listed on the IDX? (3) How much does the ROA, ROE, Inflation Rate, and GDP variables affect the stock price of Islamic Banks listed on the IDX?.

THEORETICAL FRAMEWORK

In simpler terms, the Islamic Capital Market is a capital market that follows Islamic law principles. Meanwhile, according to the DSN-MUI advisory opinion No. 40/DSN-MUI/X/2003, a Sharia Capital Market is a capital market that operates in accordance with Sharia principles. Similar to the basic understanding of the market, where the market is a meeting place for sellers and buyers to make buying and selling transactions, there is also a sale and purchase of shares in the capital market. Meanwhile, Allah SWT has clearly justified buying and selling in the Qur'an, as His word in Surah Al-Baqarah verse 275: "People who eat (transact with) usury cannot stand up, except like a person who staggers because of the devil's trance. This happens because they say that buying and selling is the same as usury. In fact, Allah has permitted buying and selling and forbids usury. Whoever has come to him a warning from his Lord (regarding usury), then he stops so that what he has obtained before becomes his and his affairs (up to) to Allah. Whoever repeats (usury transactions), they are the inhabitants of hell. They stay in it."

A bank is a company that specializes in providing financial services to help the economy. According to Prasanjaya & Ramantha, (2008) Banks are part of the financial system, which plays an important role in a country's economic development. A bank is described by Law No. 10 of 1998 as a legal body tasked with gathering funds from the general public in the form of deposits, which are then distributed back to the community in the form of credit and other forms while also raising the standard of living for many. A Sharia bank is defined as a bank that conducts its business activities in accordance with Sharia principles and, according to its own type, is made up of Sharia Commercial Banks, Sharia Business Units, and Sharia Rural Financing Banks, according to Law No. 21 2008 regarding the Islamic Banking.

Sharia principles are a rule of interaction between the bank and another party on a Sharia foundation, as stated in Article 1 paragraph 13 of Law Number 10 of 1998 concerning Banking, and are meant for actions to save money and/or provide money back for commercial activities and other activities. Other activities permitted by Sharia, such as financing based on the idea of profit sharing (Mudharabah), financing based on capital declaration (Musyarakah), and financing based on pure capital goods that are leased without voting rights (Ijarah), may be chosen, as well as the option to transfer ownership of goods that have been leased from the bank by a third party (Ijarah wa Iqtina).

Capital Asset Pricing Model

Sharpe Lintner, and Mossin initially presented the Capital Asset Pricing Model (CAPM) in the middle of the 1960s. Investors must estimate security returns, whether it is their magnitude or their estimation. According to Hasan et al., (2019) The goal of CAPM is to aid investors in stock selection and reduce risky

investments. Investors can utilize the CAPM to characterize complex market situations, reduce investment risk, and predict the amount of return that will be earned.

Return on Assets (ROA)

A financial ratio known as Return on Assets (ROA) measures a company's profitability in relation to its total assets. ROA can be used by corporate management, analysts, and investors to assess how well a company uses its resources to make a profit. The metric is frequently represented as a percentage using the net income and average assets of a corporation. A company's ability to manage its balance sheet to produce profits is more influenceive and efficient when its ROA is higher; on the other hand, a lower ROA suggests there is potential for improvement. In essence, the profit made from conducting business activities, including operating Islamic banks, is the primary reason for establishing a company, independent of the form of the firm. How successfully a firm generates profits is one of the elements that makes it appealing to investors and stakeholders (particularly for businesses that have been listed on the IDX). ROA is one of the ratios that banks use to determine their profitability. The price on assets (ROA) represents a bank's capacity to manage its assets in order to make a profit (Dietrich & Wanzenried, 2011).

Return on Equity (ROE)

Return on equity (ROE) is a financial performance metric that is calculated by dividing net income by shareholders' equity. ROE is defined as the return on net assets because shareholders' equity equals a company's assets minus its debt. ROE is regarded as a measure of a company's profitability and efficiency in generating profits. The higher the ROE, the more effective management is at generating income and growth from equity financing. A high ROE indicates that the company has generated profits from its own capital. According to Carlo, (2014) the increase in ROE will also increase the company's selling value, which will have an effect on stock prices.

Inflation Rate

An increase in the cost of goods and services generally over an extended period of time is referred to as inflation. The opposite of inflation, which is a general and ongoing increase in the price of products, is deflation. The consumer price index and producer price index, which track changes in the prices consumers and producers pay, are the two basic indicators used to calculate the rate of change in inflation. A rise in the price of only one or two items cannot be referred to represent inflation unless it also affects (or drives up the price of) further items (Caraka & Sugiyarto, 2016). The Wholesale Price Index (IHPB), the Consumer Price Index (CPI), and the Gross Domestic Product (GDP) are the three ways to calculate inflation.

Gross Domestic Product (GDP)

The total monetary or market worth of all the finished goods and services produced within a nation's boundaries during a certain time period is known as the gross domestic product (GDP) (Dynan & Sheiner, 2018). Gross domestic product (GDP) is defined by the Bureau of Economic Analysis (BEA) as the value of the goods and services generated by the country's economy less the value of the products and services used up in production. GDP is also equal to the total of government consumption expenditures and gross investment as well as gross private domestic investment, net exports of goods and services, and personal consumption expenditures. It serves as a thorough assessment of the state of the economy in a particular nation because it is a wide indicator of total domestic production.

Previous Study

Numerous researches already in existence make an effort to evaluate stock prices or other connected topics. The research typically uses some ratios, such as CAR, LDR, or alternatively, as its internal factors and typically uses some external phenomena, such as inflation rate or exchange rate. Sukesti et al., (2021) analyzed about the "Factors Affecting the Stock Price: The Role of Firm Performance" using quantitative research methods and the data processing using Partial Last Square (PLS) techniques. Based on this research conclusion, the study focused at how firm performance functions as a mediating variable between several elements that affect the stock price of companies that were listed on the Indonesia Stock Exchange between 2014 and 2018. This study used samples from 136 manufacturing companies, and SEM-PLS used the WarpPLS tool to evaluate the data. According to the study, DER and NPM have a favorable impact on stock values. The stock price is unaffected by the company's size. An influenceive mediator of the link between constructs can be ROA. All research constructs are significant, as can be observed.

Putu et al., (2014) in their research about the "Influence of Managerial Ownership, Leverage, and Firm Size on Manufacturing Company Dividend Policy" by using quantitative research methods and the data processing techniques using multiple linear regression analysis and using the classical assumption test. Based on the findings, it can be stated that management ownership has no bearing on dividend policy, leverage has a negative impact on dividend policy, and company size has a favorable impact on dividend policy.

Carlo, (2014) studied the "Influence of Price on Equity, Dividend Payout Ratio, and Price to Earnings Ratio on Stock Price" by using quantitative research methods and the data processing techniques using multiple linear regression analysis and using the classical assumption test. The conclusion in this study is that the ROE variable has a favorable influence on stock prices on the IDX, based on the results of data analysis and debate. Stock prices are positively affected by variable DPR on the IDX, the price to earnings ratio variable has no influence on stock prices.

Laksita Asmi, (2014) in her research with title "Current Ratio, Debt to Equity Ratio, Total Asset Turnover, Price on Assets, and Price Book Value as Determinants of Stock Prices" by using quantitative research methods and the data processing techniques using multiple linear regression analysis and using the classical assumption test. The research result shows that the variables CAR, ROA, and TATO all had a negative impact on stock prices, according to the findings. The DER and PBV factors, on the other hand, have a favorable impact on stock prices.

Aristya Dewi & Suaryana, (2013) conducted a study about The Influence of EPS, DER, and PBV on Stock Prices, using quantitative research methods, the data processing techniques using multiple linear regression analysis and using the classical assumption test. The study found that in the observation period of 2009–2011, EPS and PBV have a large positive impact on the stock prices of listed businesses in the Food and Beverage sector of the IDX. However, the stock prices of issuer businesses in the food and beverage sector that are listed on the IDX in the observation year 2009–2011 are significantly impacted negatively by DER.

Zuhroh et al., (2021) has conducted research on Banking stock price movement and macroeconomic indicators with k-means clustering approach. The research uses the k-means clustering method and the data analysis method using panel data regression. This study shows that the middle cluster of banking issuers is more responsive to changes in interest rates and exchange rates, whereas the higher cluster is excessive in the face inflation variable. Issuers become more susceptible to macroeconomic pressures as a result of the excessive response. However, it also permits abnormal returns, which can maximize short-term capital gains. In addition, it is evident that the higher clusters are more resilient to macroeconomic shocks based on the price coefficient from the preceding period. The issuers in the middle cluster are better suited for a short-term investment based on these traits, whereas the issuers in the upper cluster are better suited for a long-term investment.. The clustering process can be carried out by involving more parameters such as capitalization, transaction volume, and even financial ratios like return on assets or return on equity in further research to provide a more established and resilient cluster. This study also reveals that the cluster formed still has a high variance value. The implementation of a larger sample and multiple cluster-based unsupervised learning techniques, including Fuzzy C-means, Hierarchical clustering, and a Mixture of Gaussians, are also required as comparisons.

Syauqi Beik & Wardhana, (2011) studied about "The Relationship Between Jakarta Islamic Index and Other Selected Markets : Evidence From Impulse Response Function" Data from the Indonesian, Malaysian, and US conventional and Islamic stock markets are used in their research. The Islamic stock indices utilized include the Dow Jones Islamic Index of US (IMUS) for the US, the Jakarta Islamic Index (JII) for Indonesia, and the Dow Jones Islamic Index of Malaysia (DJIMY) for Malaysia. In order to investigate the stationarity of the data series, this research employs the most popular tests, including the Augmented Dickey Fuller (ADF) test, the Phillips-Perron (PP) test, the Kwiatkowski-Phillips-Schmidt-Shin (KPPS) test, VAR, and VECM approach. It can be inferred from cointegration studies that there is no long-term correlation between the markets of Indonesia and Malaysia or the US. From the viewpoint of investors, investing in Indonesia can help them diversity their portfolios, while from Indonesia's perspective, this should be an excellent chance to advertise the nation's capital market. Any shock or outside disturbance will have a substantial short-term impact on the Jakarta Islamic Index (JII). JII is impacted by the Jakarta Composite Index for about two days. The Kuala Lumpur Composite Index and the Dow Jones Islamic Index of Malaysia both have a two-day impact on the JII, but the Dow Jones and Dow Jones Islamic Index of the US have a three-day impact.

Abduh & Surur, (2013) has conducted study about "The Dynamics of Macroeconomics Variables and The Volatility of Indonesia Stock Markets: Evidence from Islamic and Conventional Stock Markets" from January 2003 to December 2010, monthly data from reliable sources were used. Exchange rate, industrial production index, and consumer price index are the macroeconomic variables used. Data on the stock markets are acquired from Jakarta Composite Index, which represents conventional stocks, and Jakarta Islamic Index, which represents Islamic equities. Phillip-Perron (PP) test and Augmented Dickey-Fuller (ADF) data processing techniques are employed. The study showed that the industrial output index and exchange rate have a long-term impact on both types of stock markets' performance. In the long run, there is a positive correlation between the industrial production index and both stock markets, but a negative correlation with the exchange rate. Exchange rates continue to have a negative and significant short-term influence on both stock markets. However, the association between inflation and the performance of traditional stock markets is only marginally significant and in the wrong direction. The performance of Islamic stock markets, however, is positively and considerably impacted by the industrial production index, as opposed to conventional stock markets.

Wulandari, (2021) conducted a research studying about "The Influence of Inflation and Interest Rates on Stock Prices in Indonesia". This study utilized a Vector Auto Regression (VAR) data processing method using a time series quantitative research methodology. The study found that greater expenses for businesses and the gradual adjustment of production prices have a negative influence on corporate profitability, which in turn lowers stock prices. However, this doesn't appear to be the case in Indonesia. The company's future and present cash flow are both impacted by changes in interest rates, which also directly affect the discount rate. The stock price responds negatively to high interest rates. Investors may switch their stock investments to other investment instruments as a result of an increase in interest rates, but this hasn't happened in Indonesia.

Astutik et al., (2015) studied about The influence of fundamental and technical variables on stock price (Study on manufacturing companies listed in Indonesia Stock Exchange), data analysis is done by means of multiple regression analysis. It can be concluded that the return on equity, price earnings ratio, and the exchange rate have significant influence on stock prices. Interest rates and the debt-to-equity ratio, however, have little impact on the company's stock price changes. Given this evidence, it is obvious that technical factors as well as fundamental factors affect stock prices, which in turn affect the company's stock price movements. It indicates that one should explain the relationship as well as the impact of technical and fundamental factors on manufacturing businesses' stock prices. The practical influence is that stock prices should be calculated using both internal and external considerations for the company.

RESEARCH METHODOLOGY

This research will be conducted on the IDX official website, OJK Official website, and/or the Sharia Banks Official Websites with a period of time from 2016 to 2020. This research is a quantitative research. Quantitative research is a type of social problem study that involves putting a theory to the test using variables that are measured in numbers and examined using statistical processes to see if the theory's predicted generalizations are right (Apuke, 2017). The data used is secondary data that researchers got from the official website of the IDX, OJK, and/or from the official websites of the Bank itself.

Population and Sample

According to Majid (2018), population is a broad topic that covers the selection of objects and individuals by researchers who have unique traits and characteristics that set them apart from one another. The researcher has chosen the object and subject to be examined in order to draw conclusions. The researcher's population determination only includes Islamic Commercial Banks that have been operational and registered with Bank Indonesia within the time frame of 2016 to 2020. Although there are 12 Islamic Commercial Banks in total, it is important to remember that not the full population is the subject of the study; consequently, further sampling is required.

According to Majid (2018) interpretation, the sample can be seen as a representation of the size and makeup of the population. It is necessary for the researcher to employ a population sample if the population is too huge for the researcher to investigate it in its whole, taking into account both time, energy, and financial constraints. *Non-Probability Sampling* is the method used to choose the sample in this research, while *Purposive Sampling* is the type utilized. This sampling strategy is based on specific criteria and must accurately

represent the community being studied. The sample is chosen by the researcher from a number of Sharia Commercial Banks (BUS), with the caveat that they must adhere to the standards and criteria for analysis. The following are the bank sample criteria that must be obtained and the operational variables

Table 1. Research Sampling Process

No	Sample Criteria	Does Not Meet Sample Criteria	Total
1.	Sharia Commercial Banks that have been listed on IDX from 2015.	3	1
	Research time		60
Number of Research Samples			**N = 60**

Operational Definition of Variables

Table 2. Operational Definition of Variables

Variable	Indicator
ROA (X1) (Dietrich & Wanzenried, 2011)	1. ROA is one of the ratios that banks use to determine their profitability. The price on assets (ROA) represents a bank's capacity to manage its assets in order to make a profit 2. $ROA = \left(\frac{Net\ Profit}{Total\ Asset}\right)\ 100\%$
ROE (X2) (Carlo, 2014)	1. The higher the ROE, the more effective management is at generating income and growth from equity financing. A high ROE indicates that the company has generated profits from its own capital. 2. The increase in ROE will also increase the company's selling value, which will have an effect on stock prices. 3. $ROE = \left(\frac{Net\ Profit}{Total\ Equity}\right)\ 100\%$
Inflation Rate (X3) (Caraka & Sugiyarto, 2016)	1. An increase in the cost of goods and services generally over an extended period of time is referred to as inflation. 2. The proxy used for this variable is CPI
GDP (X4) (Dynan & Sheiner, 2018)	1. The total monetary or market worth of all the finished goods and services produced within a nation's boundaries during a certain time period is known as the gross domestic product. 2. The value of the goods and services generated by the country's economy less the value of the products and services used up in production. 3. The proxy used for this variable is IPI

Data Analysis Techniques

Data analysis is an attempt to use statistical instruments in the data processing process to address the formulation of research topics. In this study, the researcher will process data obtained from IDX's official website and analyze it using the following tools:

1. Vector Autoregression (VAR)

The Vector Autoregression (VAR) method, which defines a "mutually causal" (causalistic) relationship between variables in the system, is a non-structural approach (as opposed to a structural approach, as in simultaneous equations) (Sulistiana et al., 2017). Christopher A. Sims created the estimation technique known as Vector Autoregession (VAR) in 1980. VAR is an a priori economics method that was developed as a response to issues with the use of a structural approach for concurrent models. In an effort to explain the relationship between the variables to be tested, a structural approach is frequently used. However, it is frequently discovered that economic theory alone falls short of precisely defining the dynamic relationship between variables. Endogenous variables can occasionally make the estimation and inference process more challenging because they are present on both sides of the equation (endogenous variables on the dependent and independent sides). According to Trisna

Ayu, (2016), commonly the VAR model can be written as follow:

$$Y_t = A_0 + A_1 Y_{t-1} + A_2 Y_{t-2} + \ldots + A_P Y_{t-p} + \varepsilon_t$$

2. Vector Error Correction Model (VECM)

A constrained version of VAR is VECM. Because non-stationary but cointegrated data forms exist, this additional restriction is necessary. Following that, VECM incorporates these cointegration restriction details into its specifications. For non-stationary series with a cointegration relationship, VECM is frequently referred to as a VAR design for this reason.

While allowing for short-term dynamics, the VECM specification limits the long-term relationship of endogenous variables to converge to their cointegration relationship. Because the deviation from the long-run equilibrium is gradually corrected by a series of partial short-run adjustments, the cointegration term is also known as the error term.

The following are the stages in testing the VAR/VECM model:

I. Stationary Test

Testing if the time series data are stationary or not is one of the steps that must be taken while estimating an economic model with time series data. Non-stationary data, on the other hand, are time series that have constant mean, variance, and covariance. Stationary data, on the other hand, do not have unit roots. The ADF (Augmented Dickey Fuller) test with a 5% significance level was used to test the stationarity of the data in this study. If the t-ADF value is less than the MacKinnon critical value, we can conclude that the data is stationary (does not contain unit roots). Testing on the unit roots is performed up to the first difference. The data collected does not include the unit root.

II. VAR Model Stability Test

Following the testing of data stationarity, the VAR model's stability is tested. The data used to test the stability of the VAR model is stationary data. If the stationary data is first difference data, that data is used rather than level data. The value of the inverse roots characteristic of the AR polynomial will indicate the stability of the VAR model. If all of the roots of a VAR system have a modulus less than one, the system is said to be stable.

III. Determining Lag Length

By identifying the ideal lag length, a good VAR model could be created. The Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), or Hannan Quinnon Criterion (HQ) criteria can be used to decide how many lags (orders) should be used in the VAR model. By using the ideal lag, it is hoped that autocorrelation issues will not recur. Too many lag lengths will increase the degree of freedom, so a smaller lag is advised to minimize the specification of autocorrelation issues in the VAR system.

IV. Cointegration Test

A cointegration test is performed to determine whether or not there is cointegration between variables. Two variables will be cointegrated if they have a long-term relationship or if they have a balance relationship. The presence of cointegration between variables is a requirement for the data to be processed using the VECM method. Long-term information can be obtained by calculating the cointegration rank in advance to determine how many equation systems can explain the entire existing system.

V. Correlation Test

Correlation testing was used to determine the relationship between the variables used in the study. In order to order, a correlation test is required (sorting variables). If the majority (more than 50%) of the correlation value between the variables is greater than 0.2, then the order of variables is specified in accordance with economic theory. If, on the other hand, the correlation value between the majority variables is less than 0.2, the correct order form is not in doubt.

VI. Impulse Response Function (IRF) Analysis

The goal of the IRF analysis is to ascertain how the VAR system's dependent variable will react to shocks in the error terms over the course of several periods. The estimates created for this IRF are concentrated on the response of a variable to a change in one standard deviation of either the variable itself or of other variables in the model. To put it another way, the purpose of the impulse response is to ascertain how a variable will affect other variables in the event of a shock or shocks. Finding the shock value's magnitude for the already-existing variables is another function of IRF.

VII. Forecast Error Variance Decomposition (FEVD) Analysis

To forecast how much each variable contributes to changes in specific variables, FEVD analysis is used. With this technique, a dynamic structure in the VAR model is characterized. This method can identify each variable's advantages and disadvantages in terms of how they affect other variables over an extended period of time.

RESULT AND DISCUSSION

In an effort to address the formulation of the research problem that the researcher described in the preceding chapter, this chapter will explain the results of data processing on the variables used in this study and the discussion. When there is cointegration of the data in the model equation, the vector auto regression (VAR) method, which the author uses in this study, will be followed by the vector error correction model (VECM) method. Eviews 12 is the program that the researcher employs to process the data for this study. The tests for the VAR and VECM models, as well as the VECM analysis using IRF and FEVD, will all be covered sequentially in this chapter along with graphs, tables, and other visual aids.

There are essentially two types of data employed in this study: internal (microeconomics) and external (macroeconomics). Return on Assets and Return on Equity are the internal variables that are used. While the inflation variable and GDP variable with proxy data using the Consumer Price Index (CPI) and Industrial Product Index (IPI), respectively, are employed as external data. For internal data, researchers used information from the Panin Dubai Syariah Bank's official website as well as the IDX website.

Data Stationarity Test Results

The test procedure used in the Unit Root Test, the first stage of the research test, is the Phillips-Perron (PP) test and the Augmented Dickey-Fuller (ADF) test with a significance level of 5%. It is stated that the data has a 95% confidence interval and is stationary because it lacks unit roots if the ADF and PP t-statistic value is less than the McKinnon critical value of 5%. The following table shows the outcomes of the test that the researchers conducted from level to level 1st Difference:

Table 3. Stationarity Test Results

VARIABLES	Probability Value of ADF		Probability Value of PP	
	Level	First Different	Level	First Different
ROA	0.0009	0	0.0191	0
ROE	0.0021	0	0.0017	0
CPI	0.7436	0	0.7376	0
IPI	0.0067	0	0.0091	0
LnSP	0.2297	0	0.2418	0

Source: Attachment 1

This study employs a 5% significance level with the parameter Phillips-Perron test and the ADF (Augmented Dickey Fuller) test as its method of stationary testing. If the t-ADF and t-PP value is less than the McKinnon critical value or the probability value is less than 0.05, the data can be determined to be stationary (does not contain unit roots). All stationary variables' data from the first difference stage were used in this study. Some variables, as shown in the table, are not stationary at the level, however at the first difference level, all variables are stationary. Since all of the data contained in the first difference level are stationary, the VECM approach will be utilized to examine these data.

VAR Model Stability Test

Prior to conducting more research, scientists must first perform the VAR stability test. Since the results of the Variance decomposition and Impulse Response Function are invalid if the VAR estimation results that will be combined with the VECM model are unstable. It is necessary to examine the VAR's stability in the form of *Roots of Characteristic Polynomials* when testing its stability.

According to Sulistiana et al., (2017) if all of a VAR system's roots have modulus value below one, the system is said to be stable. The findings of the IRF analysis are deemed invalid, though, if the VAR model is unstable. The VAR estimation to be used for IRF and FEVD analysis is stable, according to the findings of the VAR stability test conducted by the study's researchers. The results of the research model's VAR stability test, which was conducted in the two countries, are as follows:

Table 4. VAR Model Stability Test

Equation	Maximum Lag	Modulus Range
LnSP	1	0.148367 - 0.947063

Optimum Lag Test

To solve the autocorrelation issues in VAR systems, researchers can use this optimum lag length test. Because of this, it is anticipated that the autocorrelation issue will be solved if the ideal lag is used. Finding a stable VAR system's maximum lag time is the first step. A VAR system is deemed stable (stationary), in accordance with, if all of its roots have a modulus less than one and are situated entirely within the circle unit.

Table 5. Optimum Lag

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-738.6137	N/A	281220.8	27.0405	27.22298	27.11107
1	-569.9533	300.5222	2062.052	21.81648	22.91139*	22.23989*
2	-550.7875	30.6652	2608.625	22.02864	24.03597	22.80489
3	-510.6786	56.88182	1597.725	21.47922	24.39898	22.60831
4	-472.3584	47.37762	1106.713	20.99485	24.82703	22.47679
5	-433.1676	41.32852*	810.7264*	20.47882*	25.22343	22.3136

The sign (*) in the coefficient value of the LnSP variable indicates that the ideal lag length is 2.

Cointegration Test

To determine whether there is a chance of cointegration between variables, the cointegration test is run if the data are stationary at the first difference level. Cointegration of the variables shows that there is a long-term relationship between them in terms of the balance relationship. The t-statistic value can be used to determine how many cointegration relationships there are between the variables using the trace method. If the t-statistic value is higher than the critical value, cointegration exists in the model being used. While the following are the findings of the cointegration test between the variables that were conducted in this study:

Table 6. Cointegration Test

Hypothesized No. Of ce(s)	Eigenvalue	Trace statistic	0.05 Critical value	Prob.*
None *	0.718034	119.2723	79.34145	0
At most 1	0.406828	45.84615	55.24578	0.257
At most 2	0.134633	15.5544	35.0109	0.9267
At most 3	0.112849	7.167517	18.39771	0.766
At most 4	0.003831	0.222598	3.841465	0.6371

There is cointegration between the research variables, according to the cointegration test that the researchers conducted above. This makes it possible to conduct additional research using the Vector Error Correction Model (VECM) model. This clearly shows that in the model, relationships between variables not only have a short-term but also a long-term relationship.

In VECM, FEVD and IRF are the two primary types of analysis (FEVD). IRF is a vector moving average application that seeks to identify the traces of a variable's present and potential response to a specific variable's shock. FEVD works in the meantime to foretell how each variable will affect a shock or changes in particular variables. The simulation of the long-run and short-run VECM analysis is provided below.

Analysis of Vector Error Correction Model

Table 7. VECM Analysis - Long Run

Variable	Coeficient	t-Statistic
D(ROA (-1))	-13,13727	[-10,962]
D(ROE (-1))	0,81019	[11,1962]
D(CPI (-1))	0,000819	[0,01580]
D(IPI (-1))	0,023691	[0,37606]
C	-14,40448	

Table 8. VECM Analysis - Short Run

Variable	Coeficient	t-Statistic
CointEq1	-0,005603	[-1,60159]
D(LNSP(-1))	0,198644	[1,36251]
D(ROA(-1))	0,00351	[0,08989]
D(ROE(-1))	-0,000216	[-0,10774]
D(CPI(-1))	0,000549	[0,17909]
D(IPI(-1))	0,001231	[0,73329]

Based on the results of the VECM test, an equation can be formed as follows:

$$\Delta LNSP = \alpha_0 + \alpha_1 ROA_{t-1} + \alpha_2 ROE_{t-2} + \alpha_3 CPI_{t-3} + \alpha_4 IPI_{t-4} - \lambda(D(LNSP) - D(ROA) - D(ROE) - D(CPI) - D(IPI)) + \varepsilon \ldots\ldots$$

The VECM equation will look something like this if the coefficient value is applied:

$$\Delta LNSP = \alpha_0 + \alpha_1 ROA_{t-1} + \alpha_2 ROE_{t-2} + \alpha_3 CPI_{t-3} + \alpha_4 IPI_{t-4} - \lambda(D(LNSP) - 0{,}00351 + 0{,}000216 - 0{,}000549 - 0{,}001231) + \varepsilon \ldots\ldots$$

It is clear from the equation above that none of the variables in this equation significantly affect the outcome in the short-run. The t-statistics for each variable in the short-run are all less than 1.96. The ROA and ROE variables are two of the many variables with a long-run t-statistic value greater than 1.96.

In the long-run, the Return on Assets (ROA) variable, which has a coefficient value of 13.13727, has a negative impact on the stock price of Islamic banks listed on IDX. This demonstrates that if the ROA value decreases, the bank's stock price will drop by 13.13727. These results contradict the research of Safitri, (2018) which shows that Return on Assets does not have a significant effect on stock prices partially. In contrast to the long-run, ROA does not significantly affect stock prices in the short-run.

Changes in ROE value have a substantial impact on company values over the long-run. The ROE variable affects stock prices positively over the long-run, with a ROE coefficient value of 0.810190, but insignificantly affect over the short-run, with a ROE coefficient value of -0.000216. This demonstrates the need for long-term investors to pay more attention to the value of ROA and/or ROE because these two factors or variables have an effect over the long term, both positively and negatively.

Other variables, in contrast to the first two (ROA and ROE), do not significantly affect stock prices over the long or short run. The long-run effects of the CPI and IPI variables on stock prices are insignificant. As opposed to the IPI variable, which has an impact with a coefficient value of 0.023691, the CPI variable has an impact with a coefficient value of 0.000819 on the outcome. The short-run influence typically does not produce noticeable outcomes, in contrast to the long-term impact. Each variable has an effect with a coefficient value below the t-threshold statistic's of 1.96. These results also contradict the results of Trisna Ayu, (2016) research, which shows that CPI and IPI have a significant influence on stock prices.

Impulse Response Function

The Impulse Response Function (IRF), which contains a function to view the traces of the current and future response on a variable to the shock of a particular variable, is one of the basic types of analysis found in VECM.

The following illustrates how the stock price of shariah banks listed on IDX respond to shocks to macroeconomic and also microeconomic variables in our model:

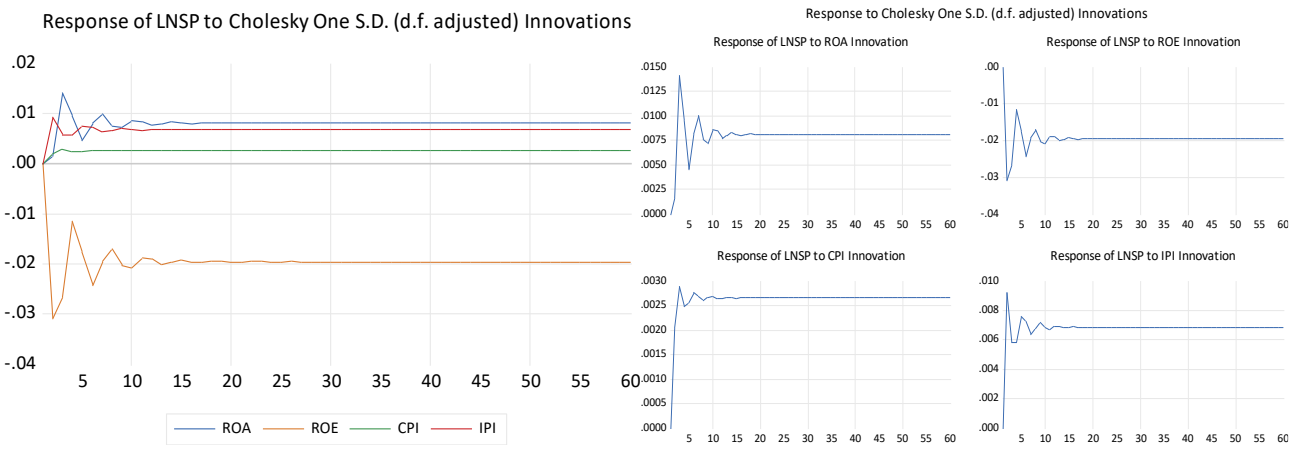

Figure 1. Impulse Response Function Analysis

The LNSP variable responds to the micro and macro factors in the following manner, as can be seen from the graph of the IRF results above:

1. The first period's deviation for the LNSP variable from Return on Assets (ROA) is 0.0000; the second period's deviation is 0.008631; and the third period's deviation is 0.0028121. From the 34th to the 60th period, it was stable at a deviation of 0.008122 after experiencing volatility up to that point. This demonstrates that it takes 34 research cycles, or 34 months, to stabilize the LNSP variable's response to the shock delivered by ROA.
2. The LNSP variable responds to Return on Equity (ROE) with a variation of 0.0000 in the first period, -0.020713 in the tenth period, -0.019538 in the twentieth period, and ultimately -0.019496 in the thirty-fifth period. From the 35th to the 60th period, after experiencing volatility up until that point, it was stable with a deviation of -0.019495. This demonstrates that it takes 35 research periods, or 35 months, to stabilize the LNSP variable's response to the shock delivered by ROE.
3. The LNSP variable will respond steadily to the shocks caused by the CPI variable within a period of 23 months, as shown by the LNSP response to the CPI variable starting with a deviation value of 0.0000 and fluctuating until period 15 with a deviation value of 0.002652 and moving steadily at 0.002659 from the 23rd period to the 60th period.
4. 4. In the meantime, the LNSP response to the IPI variable had a value of 0.0000 in the first period and varied up to the 32nd period with a deviation value of 0.006859 before stabilizing in the 33rd period to the 60th period with a deviation value of 0.006860. This demonstrates that it takes 27 periods, or 27 months, for the LNSP response to the shock caused by the IPI variable to stabilize.

Table 9. Impulse Response Function

Variables	Stable at period
ROA	34
ROE	35
CPI	23
IPI	33

Forecast Error Variance Decomposition Analysis

After the author has examined the dynamic behavior using the impulse response, the Forecast Error Variance Decomposition (FEVD) will reveal the model's properties. The percentage variance of each variable's contribution to a specific variable change is estimated using this methodology. The findings from the researchers' FEVD are listed below.

The following table displays the findings from the Variance Decomposition analysis, which explains the relative significance of each variable in the VAR system as a result of shocks.

Table 10. Forecast Error Vector Decomposition

Period	S.E.	LNSP	ROA	ROE	CPI	IPI
5	0.269844	96.36436	0.430494	2.882204	0.034699	0.28824
10	0.387035	96.42098	0.444406	2.795493	0.040842	0.298283
15	0.475894	96.54244	0.440603	2.673813	0.042583	0.300562
20	0.550695	96.5925	0.437317	2.62455	0.043457	0.302173
25	0.616466	96.62256	0.435873	2.594561	0.043981	0.303027
30	0.675868	96.64279	0.434814	2.574466	0.044328	0.303607
35	0.730456	96.65711	0.43407	2.560227	0.044575	0.30402
40	0.781238	96.66784	0.433513	2.549555	0.044727	0.304328
45	0.828916	96.67618	0.433081	2.541269	0.044904	0.304568
50	0.873996	96.68284	0.432736	2.534649	0.045018	0.30476
55	0.916863	96.68828	0.432453	2.529238	0.045112	0.304917
60	0.957812	96.29281	0.432218	2.524732	0.04519	0.305047

Source: Attachment 7

The ROE variable makes the highest contribution to ISSI in the LNSP equation by 2.5%, according to the findings of the Forecast Error Variances Decomposition (FEVD), as seen in the table above. After ROE, the ROA variable contributes the most with a contribution of 0.43%, followed by the IPI variable with a contribution of 0.3% then the CPI of 0.04%, the final variable, has the least impact.

Table 11. Forecast Error Vector Decomposition Analysis Result

Variables	Contribution (%)
ROA	0.43%
ROE	2.5%
CPI	0,04%
IPI	0,30%

With the exception of the ROE variable and its contribution value, the results show that there is not a significant difference between the current variables. In essence, investing is done with the intention of making money from the firm involved. Since investors frequently place their money in profitable ventures, the ROA and ROE variables have an impact on the share price of Islamic banks because they generally give a snapshot of the profitability of the institution. It should be noted that although the ROE variable has the biggest influence on the FEVD results, the effect is still negative because of the findings of the prior VECM research.

Other studies related to the macroeconomic impact on IDX stock price can be seen in Gunarto & Sembel (2019), Suhartono & Aulia (2023), and Tjandrasa (2019). Meanwhile, studies related to the microeconomic impact on IDX shares can be seen in Wijaya et al., (2020), Hutabarat (2020), Nur et al., (2023) and Hakim & Martono (2019)

CONCLUSION

Based on the results and discussion in the previous chapter in this study, the researcher gives several conclusions. The results of the VECM analysis show that: Stock prices are not significantly impacted by the ROA variable in the short-run. However, in the long-run, it significantly affects stock price. Stock prices are not significantly impacted by the ROE variable in the short-run. However, in the long-run, it significantly affects stock price. The CPI proxy for inflation variable does not significantly affect stock prices either over the long-run or short-run. The IPI proxy for GDP variable does not significantly affect stock prices either over the long-run or short-run.

From the results of the IRF analysis carried out, the following conclusions were obtained: The LNSP will stabilize after receiving shocks from the ROA variable in the 34th period, meaning that it takes 34 months for the LNSP to stabilize. The LNSP will stabilize after receiving shocks from the ROE variable in the 35th period, meaning that it takes 35 months for the LNSP to stabilize. The LNSP will stabilize after receiving shocks from the Inflation variable in the 23rd period, meaning that it takes 23 months for the LNSP to stabilize. The LNSP will stabilize after receiving shocks from the GDP variable in the 33rd period, meaning that it takes 33 months for the LNSP to stabilize. The impact

or influence of each microeconomic and macroeconomic variable is then discussed, with ROA contributing 0.43%, ROE 2.5%, CPI 0.04%, and IPI 0.3%, respectively.

Based on the results of the research above, the following suggestions are: The ROA and ROE of the company should be more important to investors who plan to make investments. According to this study, ROA and ROE have a considerable impact on stock prices. Investor returns will be higher in proportion to higher ROA and ROE values. It is essential to pay more attention to the ROA and ROE values for connected companies because investors use them as a guide when selecting which shares to purchase. For future researchers who are interested in this issue, development can be done, for example, by expanding the time series and adding additional variables like Earnings Per Share (EPS), Debt to Equity Ratio (DER), Exchange Rate (ER), and BI Rate.

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APPENDIX

Optimum Lag Test

VAR Lag Order Selection Criteria
Endogenous variables: LNSP ROA ROE CPI IPI
Exogenous variables: C
Date: 08/09/22 Time: 20:23
Sample: 2016M01 2020M12
Included observations: 55

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-738.6137	NA	381220.8	27.04050	27.22298	27.11107
1	-569.9533	300.5222	2062.052	21.81648	22.91139*	22.23989*
2	-550.7875	30.66520	2608.625	22.02864	24.03597	22.80489
3	-510.6786	56.88182	1597.725	21.47922	24.39898	22.60831
4	-472.3584	47.37762	1106.713	20.99485	24.82703	22.47679
5	-433.1676	41.32852*	810.7264*	20.47882*	25.22343	22.31360

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Cointegration Test

Date: 08/12/22 Time: 17:29
Sample (adjusted): 2016M03 2020M12
Included observations: 58 after adjustments
Trend assumption: Quadratic deterministic trend
Series: LNSP ROA ROE CPI IPI
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.718034	119.2723	79.34145	0.0000
At most 1	0.406828	45.84615	55.24578	0.2570
At most 2	0.134633	15.55440	35.01090	0.9267
At most 3	0.112849	7.167517	18.39771	0.7660
At most 4	0.003831	0.222598	3.841465	0.6371

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values