Research Paper

Internal and External Determinants of Bank Syariah Indonesia Capital Gain during the Pandemic

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Abstract

This paper seeks to confirm and explain the relationship between internal factors of stock-lagged return and trading volume and external factors of composite price on returns of Bank Syariah Indonesia or BRIS. We collect the daily financial data of BRIS stock, Indonesia composite index, gold price, exchange rate, and Bank of Indonesia's deposit rate from the Refinitiv database. We obtained 1,230 time-series data to be analyzed further by implementing time-series analyses. Our research shows that the autoregressive integrated moving average (1,1,0) is the best model for univariate and multivariate analysis. Our study finds that lagged return has a negative effect on the bank's daily return while trading volume has a positive impact on daily return. Our research reveals that composite price has the same effect as trading volume on daily return. Investors, especially short-term traders, may use our findings to formulate a different strategy for dealing with the volatility of Bank Syariah Indonesia stock. Our research contributes to the investment field by developing a new measurement for predicting the bank's return when conducting short-term trading.

Keywords: BRIS; ARIMA; ARCH; GARCH; Return

INTRODUCTION

The expected capital gain is an anticipated share return proceeding from the increase or decrease in the stock price in a short-term period (Adam et al., 2017; Gbadebo et al., 2023). This study examines market behavior while interpreting the movement of capital gains from stock after the end of the COVID-19 pandemic in an emerging country with a weak-form stock market. The world economy faced great deal from the COVID-19 pandemic in the years 2020–2022 (Ciravegna & Michailova, 2022). The COVID-19 pandemic will lead to a global economic recession, according to forecasts from the International Monetary Fund (IMF) and the World Bank (Junaedi & Salistia, 2020). Due to the detrimental effects of this pandemic, some commercial sectors in Indonesia also saw declines in the 2020–2022 timeframe (Supitriyani et al., 2022). Every business sector in the Indonesian capital market, which is a mirror of this nation's business people, must immediately engage in the necessary adaptation efforts to cope with these difficult situations (Widiastuti, 2020).

Bank Syariah Indonesia (BRIS), the largest Islamic bank in the Southeast Asian region, started to perform well in 2020, as evidenced by a net profit increase that exceeded 100% (Alfi, 2020). This beneficial development is primarily due to BRIS' ability to adapt to pandemic conditions (Hutauruk, 2020). The pandemic does not prevent BRIS from generating positive return growth (Walfajri, 2020). Since the announcement of the merger of state sharia banks in 2020, the share price of BRIS has increased dramatically (Alfi, 2020). The price development of BRIS shares for 2020 is depicted in Figure 1. We can observe a rise in BRIS's stock market price, which has significantly increased throughout 2020. As of December 11, 2020, the price of a BRIS share was IDR 1,785, up 21.84% from the price of the BRIS stock seven days prior. BRIS's share price was IDR 1,275 on November 11, 2020, 30 days prior, and has climbed by 40% since then.

Previous research investigate market dynamics and the creation of stock market prices in the capital market. As an illustration, study conducted by Natapura (2011) has examined the key categories of institutional investors concluding that majority of institutional investors in Indonesia

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are still rational. Sucahyo (2014) undertakes a further investigation into capital gain movements in Indonesia. His study aims to determine the impact of noise and information on the volatility of stock prices in Indonesia.

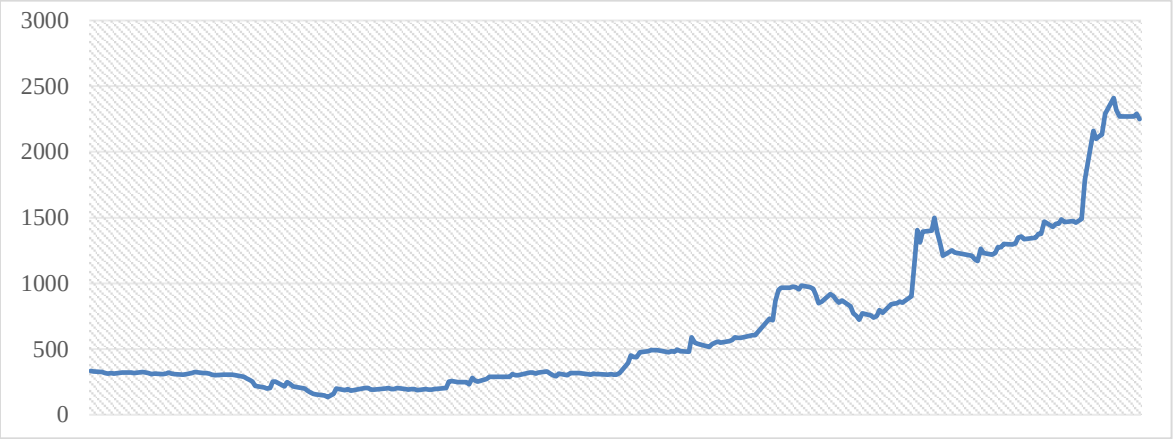

Figure 1. BRIS Daily Share Price 2020

Source: www.tradingview.com

Additionally, Ruhadi's (2009) research integrates both basic and technical models, finding that investor sentiment is a variable that encapsulates both thoughts and sentiments. Untari's (2017) paper further indicates that follower investors affect stock price volatility, particularly during market crashes. By assessing market behavior in altering stock market capital gain, our research aligns with Untari's (2017) work. As a conclusion, prior research were using multi-company in nature and that majority of them utilized one multivariate regression model to predict the dependent variable. It is still unique to come across research that concentrates on a single topic, like BRIS. By focusing on single case, researchers can compose a wider range of stock prediction models. Our study differs from the previous ones in that ours makes use of time series analysis to explain the movement of stock capital gain of one object of investigation, namely BRIS. We perform three estimations to validate that the stock-lagged return may lower the impact of greater volatility of stock return in the future.

This study offers several novelties. *Firstly*, before deciding whether to buy, hold, or sell a security, short-term traders and investors need a reliable prediction model regarding the potential rewards and threats they will encounter in the short term (Dai & Zhu, 2020). This study offers a new perspective in analyzing the daily prediction of stock capital gains in a weak-form capital market. *Secondly*, since prices in a weak-form capital market reflect less information entering the market, stock capital gains are frequently used as a benchmark for return and risk in the future (A. D. Gbadebo et al., 2023). However, it appears that the present state of the stock market, especially in an emerging economy, is no longer comparable to ideal circumstances (Al Mamun et al., 2015). Based on the previously stated context, the following issues related to BRIS exist: the direction of short-term changes in BRIS stock returns is difficult to predict, making it challenging for short-term investors to obtain a high winning rate from BRIS stock trading using reported data. According to the existing literature: Daniel et al. (2002), Demirkan and Demirkan (2014), and Iyer et al. (2002), how much impact external predictors have on the dynamics of BRIS capital gains is still unveiled. To strengthen previous research findings and efficient market theory, this study aims to predict and explain the internal and external factors affecting the dynamic changes of BRIS capital gains.

LITERATURE REVIEW

The Efficient Market Theory

According to the theory of the efficient market hypothesis, a market is considered efficient when the prices established within the market are solely driven by the information that is readily accessible and there are no anomalous returns that investors can obtain (Nazlioglu et al., 2023). According to Gumanti and Utami (2004), four essential elements must be present in order for a market to be considered efficient. First, investors assume the role of price takers and lack the ability to exert influence on the market. Investors exhibit rational behavior and engage in market activities through the systematic analysis, valuation, and trading of stocks. Information is widely accessible, abundant, and comprehensive. The availability of market information is not contingent upon its connection to other sources of information. Second, investors promptly react to incoming information, leading to the adjustment of share prices and the continuous reflection of available market information. Fama (1970) categorized the degree of market efficiency into three distinct forms, namely weak form efficient markets, semi-strong form efficient markets, and strong form efficient markets, based on the level of information assimilation. The degree to which information is digested inside the market is intricately linked to each variant of an efficient market.

The utilization of publicly accessible data or information to conduct a market analysis method is commonly referred to as fundamental analysis (Gumanti & Utami, 2004). According to Fama (1970), the strong form covers a comprehensive range of information, spanning historical, market, and confidential information limited to select individuals such as corporate management, the board of directors, and creditors. This type is the most stringent manifestation of an efficient market. Based on Fama's (1970) argument, investors in this specific market are unable to get returns that deviate significantly from the norm. According to Ady and Mulyaningtyas (2017), the Indonesian capital market is classified under the weak efficient form of capital market. Malini (2019) argues that in a weak, efficient form market, the prevailing stock prices incorporate all the knowledge included within historical data. Consequently, investors continue to have challenges in accurately forecasting returns by relying solely on publicly available information within the stock market.

The Stock Return Volatility Studies

The capital gain from a stock in the current period will be affected by the capital gain from the said stock in the previous period (Iqbal & Ningsih, 2021). Along with the rise and fall of a stock's capital gains, the law of "high risk-high return" in the capital market will certainly still apply. That is, the higher the capital gain of a stock, the higher the risk of ownership of the stock. Thus, we also formulate the relationship between expected capital gain and the risk of ownership of a stock that is controlled by past capital gains following Formula (1) specified by Greene (2012) as follows:

$$y_t = \mu + \beta y_{t-1} + \varepsilon_t \ldots (1)$$

Where y_t is the capital gain in period t of a stock in a capital market, μ is the average stock return in a period, y_{t-1} is the capital gain in one period prior to period t of stock in a capital market, and ε_t is the risk of owning a share in period t. We adjust Formula (1) according to the daily share price trend from BRIS on May 31, 2023. The movement of BRIS stock prices has a unit root condition or is not stationary and has an anomaly that correlates over time. Based on the information, we modify Formula (1) by including elements of the first difference and the first moving average of stock returns in Formula (1). In modifying Formula (1), we follow the ARIMA scheme (1,1,0) as a starting point, as suggested by Greene (2012), which we then formulate in Formula (2) as follows:

$$(y_t - y_{t-1}) = \mu - \beta(y_{t-1} - y_{t-2}) - (\varepsilon_t - \theta_1\varepsilon_{t-1}) \dots (2)$$
$$y_t^* = \mu - \beta y_{t-1}^* - \varepsilon_t^* \dots (3)$$

We simplify Formula (2) to become Formula (3), where y_t^* is the movement of capital gains in period t, denoted by the Formula: $y_t^* = y_t - y_{t-1}$, while y_{t-1}^* is the movement of capital gains in one period prior to period t, which is denoted by the equation: $y_{t-1}^* = y_{t-1} - y_{t-2}$, while β is the coefficient of y_{t-1}^*, and ε_t^* are the risk of BRIS share ownership in period t, which is affected by the risk in the previous period. We also suspect that BRIS stock risk has high volatility, so that the value of ε_t^* will be very unequal, and high heteroscedasticity will occur. These conditions have an impact on the deviation from the forecasted risk, which will be influenced by the risk of the previous period. To overcome the heteroscedasticity condition, the specification of ε_t as the determinant of ε_t^* must be modified inevitably by incorporating elements of generalized autoregressive conditional heteroscedasticity. We predict that the risk volatility of BRIS share ownership is asymmetric, that is, volatility tends to increase when bad news related to a decrease in BRIS returns occurs and tends to decrease when positive information related to an increase in BRIS returns occurs (Indupurnahayu et al., 2022; Khairunnisa & Sunendiari, 2020). Therefore, formula (3) is modified by incorporating a threshold element (1, 1), as a start, to overcome the asymmetric nature of the BRIS return volatility so that Formula (4) is formulated by following the threshold modeling proposed by Tsay (2005), as follows:

$$y_t^* = \mu - \beta y_{t-1}^* - \varepsilon_t^*,$$
where:
$$\varepsilon_t^* = \varepsilon_t - \theta_1\varepsilon_{t-1},$$
$$\varepsilon_t^*|\psi_t \sim N[0, \sigma_t^{*2}],$$
$$E[\varepsilon_t^*|\varepsilon_{t-1}^*] = 0,$$
$$Var[\varepsilon_t^*|\varepsilon_{t-1}^*, asymmetric] = \sigma_t^{*2} = \alpha_0 + \alpha_1\sigma_{t-1}^{*2} + \alpha_2\varepsilon_{t-1}^{*2} + \alpha_3 I_{t-1}\varepsilon_{t-1}^{*2},$$
$$I_{t-1} = dummy\left\{\begin{matrix}1, \varepsilon_{t-1} < 0 \\ 0, \varepsilon_{t-1} \geq 0\end{matrix}\right\} \dots (4)$$

Several capital market researchers in Indonesia have developed a univariate model to predict stock price movements based on risk volatility. The risk volatility of a single stock, Nachrowi and Usman (2007) add that the composite stock price index of a capital market also influences the value of capital gains obtained from a stock. Furthermore, Ma et al. (2021) state that the momentum of a stock's price movement will have a positive impact on the capital gain of the said stock. Based on the propositions from several previous studies, we formulate the relationship between expected capital gain, momentum, and negative sentiment from the Jakarta Composite Stock Price Index (IHSG) from formulas (1) and (4) with reference to the specifications of the Lewellen model (2002) and Fama and French (2015), as follows.

$$y_t^* = \mu - \beta y_{t-1}^* + \sum_{i=1}^{n}\gamma_i X_t + \sum_{i=1}^{n}\delta_i Z_t - \nu_t \dots (5)$$
$$\nu_t|\psi_t \sim N[0, \sigma_t^2],$$
$$E[\nu_t|\nu_{t-1}] = 0,$$
$$Var[\nu_t|\nu_{t-1}, symmetric] = \sigma_t^2 = \tau_0 + \tau_1\sigma_{t-1}^2 + \tau_2\nu_{t-1}^2 \dots (6)$$

Formulas (5) and (6) are developments from formulas (3) and (4), where X_t is an exogenous factor affecting the movement of capital gains in period t, while Z_t is control variables.

RESEARCH METHOD

To answer the purpose of this study, the data source used in this study is a secondary data source, namely data obtained from other parties and processed again for this research. The data used to measure financial performance in this context is the daily BRI Syariah closing price data for the period from May 9, 2018, to May 31, 2023. The share price data was obtained by database scrapping from the Refinitiv Workspace database (www.refinitiv.com). The total data obtained is 1230 balanced daily data for all variables. To prove the weak form efficient market hypothesis in Indonesia, we use a capital gain model based on distributed lag. Capital gain, in this case, is the return on BRIS stock prices obtained from the difference between the price of the current period and the price of the previous period.

We implemented the time-series analyses to apply Formula (5) and (6) into our research context. We measure BRIS capital gain (BRISRET) as the dependent variable, using the stock price return formula by subtracting lagged price with the current period price and scaling the subtraction result by the lagged price. The independent variable from the internal factor, as proposed by Ma et al. (2021), is the trading volume (BRISVOL) or the quantity of an asset or security that changes hands during a given period, typically a trading day. For example, the trading volume of a stock is the number of shares transacted between its daily open and close. The volume is determined by the number of a security's shares that are traded during a specified period, from May 9, 2018, to May 31, 2023, and lagged by millions of shares. The independent variable from the external factor, following Murwaningsari (2008), is the daily price of the Indonesia composite index (JKSEPRC) over 1,230 days.

We use several variables for controlling the internal factor model, adopting the model of Lewellen (2002) and Rosillo et al. (2013), which are stock momentum (BRISMOM), stock accumulation (BRISACC), and stock divergence (BRISCONV). BRISMOM is the speed at which a security's price is changing or its rate of acceleration. We calculate BRISMOM by continuously measuring price differences over a predetermined period. In this research, we construct a 10-day momentum line by subtracting the last closing price from the price from 10 days ago. BRISACC is a cumulative indicator that employs volume and price to determine whether a stock is being accumulated or distributed. BRISCONV is a momentum indicator that demonstrates the interaction between two exponential moving averages (EMAs) of the price of a stock. To calculate the BRISCONV value, we deduct the 26-period EMA from the 12-period EMA. A positive divergence in BRISCONV means a price increase is imminent, occurring when the price is displaying bullish signals. We implement several variables for controlling the external factor model following Murwaningsari (2008) and Singhal et al. (2019), which are gold price (GOLDPRC), United States Dollar-to-Rupiah exchange rate (FXRATE), and Indonesia central bank daily deposit rate (BIRATE). All the external control data are generated from the Refinitiv database.

The univariate auto-regressive moving average model of BRIS capital gain (BRISRET) is a pattern approach method that predicts the movement of the stock return through the movement pattern of the stock return itself. This approach relies more on the assumption that the movement of the observed variable already reflects all the information that influences its movement. If the stock return strengthens, this strengthening reflects a positive sentiment that affects the strengthening of the stock return. The general form of this model, as referred to in Formula (1) to (6), is as follows.

$$(BRISRET_t - BRISRET_{t-1}) = \mu - \beta(BRISRET_{t-1} - BRISRET_{t-2}) - (\varepsilon_t - \theta_1\varepsilon_{t-1}),$$

where:

$$BRISRET_t^* = BRISRET_t - BRISRET_{t-1},$$

$$BRISRET_{t-1}^* = BRISRET_{t-1} - BRISRET_{t-2},$$

Then:

$$BRISRET_t^* = \mu - \beta BRISRET_{t-1}^* - \varepsilon_t^*,$$

Where:

$$\varepsilon_t^* = \varepsilon_t - \theta_1 \varepsilon_{t-1},$$
$$\varepsilon_t^* | \psi_t \sim N[0, \sigma_t^{*2}],$$
$$E[\varepsilon_t^* | \varepsilon_{t-1}^*] = 0,$$
$$Var[\varepsilon_t^* | \varepsilon_{t-1}^*, asymmetric] = \sigma_t^{*2} = \alpha_0 + \alpha_1 \sigma_{t-1}^{*2} + \alpha_2 \varepsilon_{t-1}^{*2} + \alpha_3 I_{t-1} \varepsilon_{t-1}^{*2},$$
$$I_{t-1} = dummy \begin{Bmatrix} 1, \varepsilon_{t-1} < 0 \\ 0, \varepsilon_{t-1} \geq 0 \end{Bmatrix} \ldots (7)$$

In general, the multivariate model can be used together with the seventh model and is expressed in the form of the following equation. We used this multivariate model to test the internal (BRIS trading volume: BRISVOL) and external (Jakarta Composite Index: JKSEPRC) determinants of BRIS capital gain (BRISRET). To perform time-series analyses represented in models (7) and (8), we used STATA 14 software.

$$BRISRET_t^* = \mu - \beta BRISRET_{t-1}^* + \gamma_1 BRISVOL_t + \gamma_2 BRISMOM_t + \gamma_3 BRISACC_t + \gamma_4 BRISCONV_t + \gamma_5 JKSEPRC_t + \gamma_6 GOLDPRC_t + \gamma_7 FXRATE_t + \gamma_8 BIRATE_t - \nu_t$$

where:

$$\nu_t | \psi_t \sim N[0, \sigma_t^2],$$
$$E[\nu_t | \nu_{t-1}] = 0,$$
$$Var[\nu_t | \nu_{t-1}, symmetric] = \sigma_t^2 = \tau_0 + \tau_1 \sigma_{t-1}^2 + \tau_2 \nu_{t-1}^2 \ldots (8)$$

FINDINGS AND DISCUSSION

Table 1 shows the descriptive statistics data from both dependent and independent variables. For dependent variables, we know that the mean of BRISRET is 0.001 or 0.1 percent. This fact means the average BRIS capital gain over 1230 days is 0.1 percent. Investors may only get a low capital gain from daily trading of BRIS stocks, meaning that daily capital gain resulting from BRIS daily trading is unfavorable.

Table 1. Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
BRISRET	0.001	0.041	-0.539	0.249
BRISVOL	551.842	1173.241	6.815	13520.350
BRISMOM	13.085	216.979	-1131.358	1589.754
BRISACC	-5061.452	5009.103	-14619.220	16362.470
BRISCONV	6.544	67.069	-142.332	499.872
JKSEPRC	6201.879	646.858	3937.632	7318.016
GOLDPRC	1652.210	245.749	1173.560	2063.188
FXRATE	14514.480	498.410	13565.000	16550.000
BIRATE	4.174	1.201	2.777	6.164

Table 2 displays the multicollinearity results amongst independent variables. The results inform us that all variables have met the minimum requirement for passing the no-multicollinearity condition, which is all the Variance Inflation Factor (VIF) scores below 10.000. The maximum VIF scores belong to the BRISCONV variable. The stationarity test results are exhibited in Table 3 to find out whether each variable can be regressed using the ordinary least squares with the time series method. We may find that every related variable is stationary at the first difference, as the P-value of the first difference is significant at 0.050.

Table 2. Multicollinearity Test

Variable	VIF	1/VIF
BRISCONV	3.200	0.312
GOLDPRC	2.740	0.365
BRISMOM	2.610	0.383
BIRATE	2.470	0.405
BRISACC	2.160	0.462
BRISVOL	1.610	0.622
FXRATE	1.310	0.761
JKSEPRC	1.210	0.828
Mean VIF	2.160	

Based on Table 3, JKSEPRC has a trend issue at the unit root due to the P-value of the unit root being 0.737 or above the 0.050 significance level. If a variable faces a trend issue, then the unit root data of the particular variable will not achieve the normality condition. The effect of this circumstance is that we cannot render the data using the normal regression procedures because if we do so, the regression results will be biased. However, the problem is settled by differencing the data at the first difference.

Table 3. Stationarity Test

Variable	Unit Root - Prob Z(t)	First Diff - Prob Z(t)	Results
BRISRET	0.000	0.000	Stationary at D0
BRISVOL	0.000	0.000	Stationary at D0
BRISMOM	0.000	0.000	Stationary at D0
BRISACC	0.016	0.000	Stationary at D1
BRISCONV	0.610	0.000	Stationary at D1
JKSEPRC	0.737	0.000	Stationary at D1
GOLDPRC	0.579	0.000	Stationary at D1
FXRATE	0.016	0.000	Stationary at D1
BIRATE	0.484	0.000	Stationary at D1

After forming the data using the first difference method, we should choose the best univariate ARIMA model by comparing the values of the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC). Based on the AIC and BIC scores, we find that the model that has a minimum level of AIC and BIC is ARIMA (1,1,0) with the AIC of -3074.149 and the BIC of -3064.463. The results of Table 4 strengthen our assumption of using the ARIMA (1,1,0) in formulating the autoregressive models from the model (1) to (8).

Table 4. Choosing the Best Univariate ARIMA Model

Model	AIC	BIC
ARIMA (2,0,0)	-4346.652	-4331.310
ARIMA (2,1,0)	-3180.244	-3165.716
ARIMA (2,1,1)	-3190.818	-3176.290
ARIMA (1,0,0)	-4347.782	-4337.554
ARIMA (1,1,0)	-3074.149	-3064.463
ARIMA (1,1,1)	-3186.525	-3176.839

The univariate model of ARIMA (1,1,0) is used for building the ARCH/GARCH model and the multivariate model of ARIMAX. To specify the ARCH model, we test the univariate model of ARIMA (1,1,0) using the ARCH/GARCH disturbance test. The test results, as presented in Table 5, find that the univariate model has ARCH/GARCH disturbance. The consequence of this finding is that researchers may consider reformulating the residuals of ARIMA (1,1,0) and ARIMAX (1,1,0) using

the conditional heteroscedasticity procedure as formulated in model (4) and (7) as well as model (5) and (8).

Table 5. The ARCH Test for the Best Univariate Model

ARIMA (1,1,0)				
Lags (p)	**Chi2**	**df**	**Prob > chi2**	**Results**
1.000	51.718	1.000	0.000	ARCH/GARCH Disturbance

We test the internal factor of lagged return using the univariate model of ARIMA (1,1,0) as presented in Table 6. From the results of univariate analysis, we can confirm that the coefficient of lagged return (LAGRET) is -0.493 and significant at 0.050. Based on formula (4), the risk volatility of BRIS share ownership can be determined by calculating the value of $\sqrt{\sigma_t^{*2}}$ from the return on BRIS shares for each period t (Ma et al., 2021). Our findings support Nachrowi and Usman (2007) findings explaining that this volatility ($\sqrt{\sigma_t^{*2}}$) will have a negative impact on the movement of stock returns (y_t^*).

Table 6. The Best Model of Univariate Time-Series Analyses

BRISRET	**ARIMA (1,1,0)**			**ARIMA (1,1,0) – ARCH (1,1)**			**ARIMA (1,1,0) – GARCH (1,1)**		
	Coef.	**Prob. (Z)**		**Coef.**	**Prob. (Z)**		**Coef.**	**Prob. (Z)**	
LAGRET	**-0.493**	**0.000**	***	**-0.433**	**0.001**	***	**-0.471**	**0.000**	***
ARCH				0.750	0.000	***	0.643	0.001	***
GARCH							0.354	0.008	***
Cons.				0.001	0.000	***	0.000	0.176	
AIC	-3074.149			-3295.342			-3344.967		
BIC	-3064.463			-3280.814			-3325.597		
Prob (Chi2)	0.000	***		0.001	***		0.000	***	

BRISRET	**ARIMA (1,1,0) – TGARCH (1,1)**			**ARIMA (1,1,0) – EGARCH (1,1)**		
	Coef.	**Prob. (Z)**		**Coef.**	**Prob. (Z)**	
LAGRET	**-0.470**	**0.000**	***	**-0.478**	**0.000**	***
ABARCH	0.325	0.004	***			
ATARCH	0.139	0.243				
SDGARCH	0.503	0.001	***			
EARCH				0.031	0.725	
EARCHA				0.634	0.001	***
EGARCH				0.972	0.000	***
Cons.	0.006	0.264		-0.284	0.781	
AIC	-3344.359			-3315.581		
BIC	-3320.146			-3291.368		
Prob (Chi2)	0.000	***		0.000	***	

In addition to volatility, stock returns for the past period, according to Murwaningsari (2008), also influence the movement of stock returns for the current period. Nachrowi and Usman (2007) found that past stock returns influence present stock returns. Our findings also signify the

results of Indupurnahayu et al. (2022) study regarding the significant influence between past stock returns and present stock returns. From several relevant previous studies, it can be interpreted that stock returns for the current period can be influenced by stock returns of the prior period.

Apart from the lagged return, the trading volume also influences the price movement of a stock. We use Formulas (5) and (6) as the basic Formulas to determine the relationship between trading volume and BRIS stock capital gains. We make trading volume in period t the second exogenous factor of X_t, besides lagged return, which is able to increase the value of capital gains, y_t^*, from BRIS shares in period t. Trading volume is widely used by daily traders (scalpers) in the Indonesian capital market as a sign for buying and selling shares in the short term. If there is a surge in volume, then this spike is a positive sign to get ready to buy because, in the near term, the stock price will suddenly rise. The increase in the IHSG, in general, can reflect positive sentiment on the stock market. This positive sentiment can influence investors' perceptions of individual stocks such as BRIS, and they may be more inclined to buy those shares. Increased demand can push BRIS's share price up, which has an impact on higher stock returns.

Table 7. The Multivariate Time-Series Analysis of Internal Factors

INTERNAL FACTORS	ARIMAX (1,1,0)			ARIMAX (1,1,0) - GARCH (1,1)		
	Coef.	Prob. (Z)		Coef.	Prob. (Z)	
LAGRET	**-0.470**	**0.000**	***	**-0.367**	**0.000**	***
BRISVOL	**0.000**	**0.000**	***	**0.000**	**0.028**	**
BRISMOM	0.000	0.000	***	0.000	0.000	***
BRISACC	0.000	0.000	***	0.000	0.000	***
BRISCONV	-0.001	0.000	***	-0.002	0.000	***
ARCH				0.787	0.000	***
GARCH				0.131	0.056	*
Cons.				0.000	0.000	***
AIC	-3505.918			-3756.460		
BIC	-3476.862			-3717.719		
Prob (Chi2)	0.000	***		0.000	***	
INTERNAL FACTORS	**ARIMAX (1,1,0) - TGARCH (1,1)**			**ARIMAX (1,1,0) - EGARCH (1,1)**		
	Coef.	**Prob. (Z)**		**Coef.**	**Prob. (Z)**	
LAGRET	**-0.328**	**0.000**	***	**-0.326**	**0.000**	***
BRISVOL	**0.000**	**0.000**	***	**0.000**	**0.000**	***
BRISMOM	0.000	0.000	***	0.000	0.000	***
BRISACC	0.000	0.000	***	0.000	0.000	***
BRISCONV	-0.002	0.000	***	-0.002	0.000	***
ABARCH	0.523	0.000	***			
ATARCH	0.029	0.830				
SDGARCH	0.237	0.028	**			
EARCH				-0.092	0.336	
EARCHA				0.934	0.000	***
EGARCH				0.720	0.000	***
Cons.	0.011	0.001	***	-1.944	0.010	***
AIC	-3743.614			-3714.383		
BIC	-3700.029			-3670.799		
Prob (Chi2)	0.000	***		0.000	***	

Our findings strengthen the proposition of a weak form efficiency of Indonesian capital

market. The weak form hypothesis posits that asset prices in financial markets comprehensively incorporate all relevant prior trading information, with a special emphasis on historical price and volume data. Our findings comply with this weak efficient form argument because we find that the lagged return, another proxy for measuring stock price movement, and trading volume are the two major variables determining stock prices (or returns) in the future. Under the concept of weak form efficiency, it is widely held that the present asset prices already reflect all the relevant information derived from historical market prices and trade volumes, as described by Ady and Mulyaningtyas (2017).

Table 8. The Multivariate Time-Series Analysis of External Factors

EXTERNAL FACTORS	ARIMAX (1,1,0)			ARIMAX (1,1,0) - GARCH (1,1)		
	Coef.	Prob. (Z)		Coef.	Prob. (Z)	
LAGRET	**-0.484**	**0.000**	***	**-0.400**	**0.000**	***
JKSEPRC	**0.000**	**0.000**	***	**0.000**	**0.000**	***
GOLDPRC	0.000	0.827		0.000	0.395	
FXRATE	0.000	0.186		0.000	0.512	
BIRATE	0.009	0.431		0.004	0.757	
ARCH				0.887	0.000	***
GARCH				0.295	0.002	***
Cons.				0.000	0.212	***
AIC	-3114.046				-3403.674	
BIC	-3084.990				-3364.932	
Prob (Chi2)	0.000	***		0.000	***	
EXTERNAL FACTORS	**ARIMAX (1,1,1) - TGARCH (1,1)**			**ARIMAX (1,1,1) - EGARCH (1,1)**		
	Coef.	**Prob. (Z)**		**Coef.**	**Prob. (Z)**	
LAGRET	**-0.083**	**0.438**		**-0.014**	**0.708**	
JKSEPRC	**0.000**	**0.000**	***	**0.000**	**0.000**	***
GOLDPRC	0.000	0.887		0.000	0.975	
FXRATE	0.000	0.784		0.000	0.803	
BIRATE	0.008	0.549		0.009	0.487	
MA	-0.448	0.000	***	-0.492	0.000	***
ABARCH	0.350	0.010	***			
ATARCH	0.205	0.201				
SDGARCH	0.437	0.003	***			
EARCH				0.028	0.817	
EARCHA				0.701	0.011	***
EGARCH				0.916	0.000	***
Cons.	0.006	0.199		-0.635	0.633	
AIC	-3426.671			-3369.956		
BIC	-3378.244			-3321.529		
Prob (Chi2)	0.000	***		0.000	***	

Table 9 shows the robustness test results to verify the validity of the BRIS prediction models using the same internal and external determinants. In conducting the robustness test, we modify the proxy for measuring the dependent variable of capital gain. We place stock price as the main indicator of equity capital gain while the predictors remain the same. We also use the ARIMAX (1,1,0) as the primary method of analysis for testing the internal and external factors that influence the equity price. Based on Table 9, the results of the robustness test show the same results as the initial multivariate test in Table 8. The main independent variable from internal factors, BRISVOL,

indicates a p-value of 0.030, which is lower than the significance level of 0.050.

Table 9. Robustness Test

INTERNAL	**ARIMAX (1,1,0)**			**EXTERNAL**	**ARIMAX (1,1,0)**		
BRISPRC	**Coef.**	**Prob. (Z)**		**BRISPRC**	**Coef.**	**Prob. (Z)**	
LAGRET	**0.093**	**0.497**		**LAGRET**	**-0.023**	**0.816**	
BRISVOL	**0.005**	**0.030**	**	**JKSEPRC**	**0.295**	**0.000**	***
BRISMOM	0.296	0.000	***	GOLDPRC	0.087	0.412	
BRISACC	0.015	0.000	***	FXRATE	0.059	0.006	***
BRISCONV	2.362	0.000	***	BIRATE	16.929	0.097	*
AIC	8997.274			AIC	10001.710		
BIC	9026.331			BIC	10030.770		
Prob (Chi2)	0.000	***		Prob (Chi2)	0.000	***	

This finding means that BRISVOL has a significant influence on the dependent variable, which in this term is BRIS price (BRISPRC). The positive coefficient sign of BRISVOL, 0.005, implies that a heightened trading volume may enhance the performance of Islamic bank stock price in the weak form efficient market. Nevertheless, the BRIS lagged return exhibits a non-significant influence on the BRIS price, as shown by the p-value of 0.497, which is higher than 0.050. The robustness test conducted for external factors yielded outcomes that align with the findings of the first regression model presented in Table 8. The JSKEPRC, which serves as the main indicator of external forces, exerts a notable beneficial impact on BRIS pricing. Our observation is supported by the statistically significant p-value of 0.000 and the positive coefficient of 0.295, as presented in Table 9. Hence, the findings suggest that a favorable trajectory of the state composite index could potentially stimulate an upward trend in the stock price of Islamic banks within the context of a weak form efficient market. The results obtained from the robustness test provide confirmation of the overall validity of our internal and external factors models. As a result, these models may be effectively employed for the purpose of predicting the fluctuations in BRIS price and return. The reliability of our BRIS models was further assessed by a sensitivity test, as presented in Table 10.

The primary analytical tools utilized for conducting the sensitivity test involve the implementation of ARIMAX (1,1,0). The simulations in our prior model of internal and external elements are executed using an ordered step-by-step approach. The primary dependent variables, LAGERET and BRISVOL, along with the controls BRISMOM, BRISACC, and BRISCONV, are systematically incorporated and displayed in Models 1 to 5 (Table 10).

Table 10. Sensitivity Analysis

INTERNAL	**MODEL 1**			**MODEL 2**			**MODEL 3**		
BRISRET	**Coef.**	**Prob. (Z)**		**Coef.**	**Prob. (Z)**		**Coef.**	**Prob. (Z)**	
LAGRET	**-0.493**	**0.000**	***	**-0.509**	**0.000**	***	**-0.483**	**0.000**	***
BRISVOL				**0.000**	**0.000**	***	**0.000**	**0.000**	***
BRISMOM							0.000	0.000	***
AIC	-3074.149			-3280.386			-3360.516		
BIC	-3064.463			-3265.857			-3341.145		
Prob (Chi2)	0.000	***		0.000	***		0.000	***	
INTERNAL	**MODEL 4**						**MODEL 5**		
BRISRET	**Coef.**	**Prob. (Z)**					**Coef.**	**Prob. (Z)**	
LAGRET	**-0.444**	**0.000**	***				**-0.470**	**0.000**	***
BRISVOL	**0.000**	**0.000**	***				**0.000**	**0.000**	***
BRISMOM	0.000	0.001	***				0.000	0.000	***
BRISACC	0.000	0.000	***				0.000	0.000	***
BRISCONV							-0.001	0.000	***

AIC	-3405.691			-3505.918	
BIC	-3381.477			-3476.862	
Prob (Chi2)	0.000	***		0.000	***

EXTERNAL	**MODEL 6**			**MODEL 7**			**MODEL 8**		
BRISRET	**Coef.**	**Prob. (Z)**		**Coef.**	**Prob. (Z)**		**Coef.**	**Prob. (Z)**	
LAGRET	**-0.493**	**0.000**	***	**-0.485**	**0.000**	***	**-0.486**	**0.000**	***
JKSEPRC				**0.000**	**0.000**	***	**0.000**	**0.000**	***
GOLDPRC							0.000	0.709	
AIC	-3074.149			-3118.331			-3116.520		
BIC	-3064.463			-3103.803			-3097.149		
Prob (Chi2)	0.000	***		0.000	***		0.000	***	

EXTERNAL	**MODEL 9**			**MODEL 10**		
BRISRET	**Coef.**	**Prob. (Z)**		**Coef.**	**Prob. (Z)**	
LAGRET	**-0.484**	**0.000**	***	**-0.484**	**0.000**	***
JKSEPRC	**0.000**	**0.000**	***	**0.000**	**0.000**	***
GOLDPRC	0.000	0.819		0.000	0.827	
FXRATE	0.000	0.183		0.000	0.186	
BIRATE				0.009	0.431	
AIC	-3115.867			-3114.046		
BIC	-3091.654			-3084.990		
Prob (Chi2)	0.000	***		0.000	***	

The simulation results presented in Table 10 indicate that both LAGRET and BRISVOL exhibit significant effects, albeit with contradictory signals, on BRISRET. The main internal factors in Models 1 through 5 consistently demonstrate statistical significance, as evidenced by the consistently low p-value of 0.000. Hence, it can be confirmed that both LAGRET and BRISVOL exhibit insensitivity towards the dynamics of other predictors. These findings further validate the reliability of our internal factor model in predicting the return of BRIS shares. The observation is also applicable to our model of external factors since it demonstrates that the primary variable representing external influences, JSKEPRC, exerts a significant positive impact on BRISRET. The presence of a low p-value (0.000) for JKSEPRC indicates a consistent outcome across all external models, specifically from models 6 to 10. This finding suggests that our external model demonstrates a high level of reliability in forecasting BRIS return during periods characterized by significant fluctuations in external factors.

CONCLUSIONS

The study has achieved its objective to validate and elucidate the correlation between the lagged return and trading volume (stock internal factors) and the IHSG price (stock external factor) on BRIS returns. Based on our research findings, the ARIMA (1,1,0) model is most suitable for performing the univariate analysis. In contrast, the ARIMAX (1,1,0) model is deemed the most appropriate for conducting the multivariate analysis. The application of both univariate and multivariate models reveals that lagged return has a detrimental impact on the daily return of BRIS. The trading volume demonstrates a favorable influence on the daily return of BRIS. The IHSG price and trading volume exhibit a similar impact on the daily return of BRIS, as indicated by the employed models. Our research confirms the weak-form efficiency of the Indonesian stock market through a case study of BRIS shares.

LIMITATION & FURTHER RESEARCH

Our study limits the analysis on single equity and hence the findings cannot be generalized to a broader context within the stock market. Future research may expand our models by using

cross-sectional data to improve the generalization. Our study may help investors, particularly those engaged in short-term trading, develop an alternative method for managing the volatility associated with BRIS stock. Our research contributes to financial accounting literature through the development of a novel metric that may be utilized to forecast the BRIS return in the context of short-term trading activities.

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