Efficient Market Hypothesis and Forecasting in the Industrial Sector on the Indonesia Stock Exchange

by 1340. 2240. Faizul Mubarok, Mohammad Masykur Fadhl 1340. 2240. Faizul Mubarok, Mohammad Masykur Fadhl

Submission date: 25-Jun-2020 11:12AM (UTC+0700)
Submission ID: 1349358419
File name: 1340._2240-6583-1-SM_artikel_masuk.doc (314.5K)
Word count: 4653
Character count: 26157

Efficient Market Hypothesis and Forecasting in the Industrial Sector on the Indonesia Stock Exchange

Faizul Mubarok, Mohammad Masykur Fadhli
fayzmubarok@uinjkt.ac.id
fadhliem10@gmail.com
Universitas Islam Negeri Syarif Hidayatullah Jakarta

Abstract

The presence of the stock market has helped to increase economic growth in a country. However, high levels of volatility plus economic uncertainty make investors have to rethink investing in the capital market. This study aims to examine the share of each industrial sector on the stock exchange in Indonesia by testing the Efficient Market Hypothesis (EMH) and forecasting the growth of returns for each industry. The method that will be used in this study includes variance ratio, data stationarity test, Autoregressive Integrated Moving Average (ARIMA), and Autoregressive Conditional Heteroskedasticity (ARCH). The results show that the industrial sectors on the Indonesia Stock Exchange are inefficient in the weak form. In forecasting, almost all indices experience a contraction of growth at the beginning of the forecasting period. The stakeholders are expected to be more active in the market by frequently buying and selling securities because the market is proven inefficient, and the market can be defeated.

Keywords: Efficient Market Hypothesis, Variance Ratio, ARIMA, ARCH, Forecasting

Introduction

The purpose of establishing a capital market is intended to support a country's economic growth (Zhao, Chen and Hao, 2018; Neanidis, 2019). The stock market can help other industries to become more significant (Uygur and Taş, 2014; Li, 2016). A functioning capital market can increase economic efficiency, investment, and economic growth (Coşkun *et al*., 2017). A new stock market can boost economic growth by aggregating information about its prospects, thereby directing capital to investments with high returns (Kudrin and Gurvich, 2015).

The effects of opening a stock exchange show results with increased productivity (Rizvi and Arshad, 2016; Hu and Prigent, 2019). A new stock exchange can also boost economic growth by reducing ownership of liquid assets and increasing physical capital growth (Chen and Imam, 2013). Uncertainty in the global economy causes many to interpret how stock prices or markets work (Roy and Kemme, 2020). One of them is the Efficient Market Hypothesis, which is a fair-game model which indicates that investors are confident with current stock prices that reflect comprehensive information about securities—the expected rate of return based on price impacts the value that is consistent with the risk (Malini, 2019).

Financial markets move dramatically, and stock prices can be too volatile where volatility is an essential phenomenon for financial markets in the world (Jebran *et al*., 2017; Liu and Yang, 2017). The relationship between volatility and risk is difficult to understand, but stock market volatility is not a bad thing (Byström, 2016). Fundamentally regular instability can form the basis of efficient stock prices (Tuyon and Ahmad, 2016). This happens when the dependence of volatility implies predictability received by traders and short-term investors (Audrino, Sigrist and Ballinari, 2020). The importance of volatility is widespread in the financial world—equilibrium prices, obtained from the asset pricing model when derivative valuation depends on reliable volatility forecasting (Gu, Kelly and Xiu, 2020). Portfolio managers, risk arbitrage, and company treasurers see volatility trends, where changes in stock prices can have an impact on investment and risk management (Heywood, Marsland and Morrison, 2003).

Volatility on the stock exchange also makes stock prices erratic. Three critical events occur on the transaction in a certain period, and these events are bull, bear, and crash (Byström, 2016). The bull market is when an error occurs on the stock market where stock prices rise, production is secure, and employment is wide open (Bouteska and Regaieg, 2018). While the bear market, on the contrary, where stock prices fall, the economy slows, unemployment rises, and inflation is also increasing (Bhattarai, 2016). The cause of bulls and bears is the result of

supply and demand for securities (Gourène and Mendy, 2018). To qualify as a bull and bear market, the market must move in the current direction for a specified period.

Barbash (2002) explains that the bull market, bears, and crashes are good, bad, and terrible news. In the bull market, many share prices go up. In the bear market, many share prices are down, whereas a crash is where stock prices go down very quickly. When production grows, and people work and spend money, the market tends to anticipate higher company earnings. At such times, the demand for shares exceeds the supply, which will encourage the growth of share value.

The key to investing successfully in a bull market is to take advantage of rising stock prices, which means buying securities early by paying attention to the growth in value and selling when it reaches its highest point (Cai and Lu, 2019). It seems simple, but it's not like that, because no one knows when the market will start to rise or have reached its peak. Then next, the key to success investing in the bear market has several strategies where investors try to secure their assets in securities with low volatility, and some also take advantage of low stock prices (Frydman and Camerer, 2016).

Research related to efficient market hypothesis and forecasting has been done before by Ahmar and del Val (2020) on the Spanish stock exchange. Sánchez-Granero, Balladares, Ramos-Requena, and Trinidad-Segovia (2020) tested the efficient market hypothesis theory on the Latin American stock exchange. Qin and Singal (2015) examined stocks in the S&P 500 index and shares that were not indexed in the United States. Rajesh, Selvam, Raja, Lingaraja, and Vasanth (2015) tested the efficient market hypothesis theory on sectoral indices on the National Stock Exchange in India. Phan and Zhou (2014) on the Vietnam capital market. Dong, Bowers, and Latham (2013) examined the efficient market hypothesis theory on the global money market index. Guidi and Gupta (2013) examined the efficient market hypothesis theory of stock ASEAN countries. Sewell (2012) examined the efficient market hypothesis theory on the Dow Jones Industrial Average (DJIA). Hamid, Suleman, Shah, and Akash (2010) tested an efficient market hypothesis on exchanges in Asia-Pacific countries.

From the research that has been done, there is still no research that discusses the theory of Efficient Market Hypothesis and forecasting in the industrial sector on the Indonesia Stock Exchange. Considering that Indonesia is a developing market, and the world is also shifting industry 4.0. At the same time, technology will disrupt each industry sector. It is essential to carry out the theory of the Efficient Hypothesis Market theory and forecasting in the industrial area on the Indonesia Stock Exchange. This research can contribute, first, to determine a reasonable investment strategy. Second, determine whether the sectoral industry index on the Indonesia Stock Exchange is efficient. Third, for stakeholder consideration.

Theoretical Framework and Hypothesis

Research related to the Efficient Market Hypothesis has been conducted several times by researchers in the world, such as Ahmar and del Val (2020), to predict the closing price of the stock market in Spain in the short term. The results show that the ARIMA model is the most suitable method for forecasting. The results of this forecast are expected to be used to make policies.

Sánchez-Granero et al. (2020) tested the Efficient Market Hypothesis on stock exchanges in Latin America by using the statistical arbitration technique known as Pairs Trading. The sample used in this study was shared in Nasdaq, 65 shares in Argentina, Brazil, and Chile, 21 stocks in Brazil, and 28 shares in Chile. The result is an Efficient Market Hypothesis theory of weak form accepted. Arbitration opportunity is not available because the stock price fully reflects all historical information available.

Rajesh et al. (2015) tested the efficient market hypothesis of weak forms on sectoral indices on the National Stock Exchange in India. This study uses the autocorrelation method to check whether the sectoral index is efficient or not. As a result, the sectoral index listed on the National Stock Exchange has not been proven to be productive in a weak form.

Qin and Singal (2015) examine whether there is an effect between stock price efficiency and indexing. The sample used in this study is the S&P 500 index and stocks that are not included in the S&P 500. The methods used include descriptive statistics, PEAD Analysis, Random Walk, Cross-Sectional Analysis. The results show that indexing reduces the level of efficiency of stock prices. Stocks that have a higher index level have less informative prices.

Phan and Zhou (2014) examined the efficiency of weak form markets in developing markets with stock exchanges in the country of Vietnam being the research sample. The methods used in this study include descriptive statistics, autocorrelation, runs tests, variance ratio test. The experiment results found that the random walk hypothesis was rejected even though it allowed a random walk in the third cycle. Researchers concluded that during ten years of operation, the efficiency of the Vietnam stock exchange increased significantly.

Dong et al. (2013) tested the Efficient Market Hypothesis theory on 37 of the most influential stock exchanges in the world, two crude oil prices, gold prices, and four big-money markets in America. This study uses the Granger Causality method. As a result, all indices studied indicate that all are efficient in a weak form so that there should be no global market leader in the stock market.

Guidi and Gupta (2013) tested the Efficient Market Hypothesis theory on the stock exchange in ASEAN using a univariate or multivariate variance ratio test. Stock exchanges used as samples for research are stock

exchanges in Indonesia, Singapore, Malaysia, Thailand, the Philippines, and Vietnam. The results of this study are that stock exchanges in Indonesia, Malaysia, the Philippines, and Vietnam are inefficient in their weak form. Another case with Singapore and Thailand are found to be efficient in an inadequate way.

Sewell (2012) tested the Efficient Market Hypothesis theory on the Dow Jones Industrial Average using four analytical tools, namely autocorrelation, runs test, long memory, and investment newsletter. The autocorrelation test results show that the Dow Jones Industrial Average is inefficient in monthly and annual data while efficient in daily and weekly data. The runs test shows that the daily and weekly data indicate that the data is not suitable. In long memory, shows that the annual return is less efficient.

Hamid et al. (2010) tested the efficiency of weak form markets in the Asia Pacific market including Pakistan, India, Sri Lanka, China, Korea, Hong Kong, Indonesia, Malaysia, the Philippines, Singapore, Thailand, Taiwan, Japan, and Australia. The methods used in this study are descriptive statistics, autocorrelation, runs tests, unit root, and variance ratio. The result is that none of the countries' exchanges has been proven to be efficient in a weak form.

Research Method

This study uses monthly data on stock price indexes in each sector on the Indonesia Stock Exchange from February 1996 to March 2020. The selection of each sector index as research objects is based on the Jakarta Stock Industrial Classification (JASICA) classification. There are nine sectors included in the JASICA classification, namely, the agricultural sector (JKAGRI), the mining sector (JKMING), the basic and chemical industry sector (JKBIND), the various industry sectors (JKMISC), the consumer goods sector (JKCONS), the property, real estate, and building construction sector (JKPROP), the infrastructure, utilities, and transportation sector (JKINFA), the financial sector (JKFINA), the trade, services, and investment sectors (JKTRAD).

This research uses several methods to answer the research objectives. To test the Efficient Market Hypothesis theory, the weak form of the researcher uses variance ratio (Phan and Zhou, 2014).

$$VR(j) = \frac{\frac{1}{nq-1}\sum_{t=1}^{nq}\left(Pt - Pt-q - \frac{1}{nq}(Pnq - P0)\right)^2}{\sigma_a^2}$$

VR(j) is the variance ratio of j difference, $\sigma_b^2(q)$ is the scale of the variance of j difference, σ_a^2 is the variance of the first differentiation, and p is the closing price. Furthermore, forecasting in this study uses the Autoregressive Conditional Heteroskedasticity (ARCH) method. The variance of time series residual data are not only influenced by the independent variable, but also by the residual value of the variable under study.

$$Y_t = \beta_0 + \beta_1 X_{1t} + \varepsilon_t$$
$$\sigma\tau^2 = \alpha_0 + \alpha_1 . \varepsilon_{t-1}{}^2$$

Where Y is the dependent variable, X is the independent variable, ε is a residual, σt^2 is residual $\alpha_1 . \varepsilon_{t-1}{}^2$ is the ARCH component.

Data Analysis and Discussion

Test Variance Ratio (VR) of stock prices to the nine industry sector indices to answer the Efficient Market Hypothesis. VR is calculated for intervals (j) from observations 2, 4, 8, and 16. The result of VR (j) > 1 implies a series of positive correlations, and VR (j) < 1 presupposes a set of negative relationships. Based on table 1, the results show that VR testing for intervals of 2, 4, 8, and 16 where the value of VR ≠ 1 so that the data does not follow a random walk means that the shares of each industry sector are inefficient in the weak form.

Table 1. Variance ratio test results

Variable	Period = J	2	4	8	16
JKAGRI	VR(J)	0,628371	0,264589	0,141044	0,071576
JKBIND	VR(J)	0,695167	0,309791	0,178660	0,085182
JKCONS	VR(J)	0,674047	0,286477	0,161823	0,088478
JKFINA	VR(J)	0,616303	0,280873	0,144937	0,081598
JKINFA	VR(J)	0,567262	0,219147	0,130343	0,067912
JKMING	VR(J)	0,575120	0,268510	0,162141	0,089954
JKMISC	VR(J)	0,572431	0,308175	0,142871	0,085286
JKPROP	VR(J)	0,624541	0,315204	0,163142	0,097611
JKTRAD	VR(J)	0,729582	0,376114	0,183531	0,109876

Table 2 shows that the unit root test results indicate that the ninth index data is stationary. This is indicated by the statistical value of augmented dickey fuller (ADF) test, which is smaller than the McKinnon critical level, at a predetermined critical value, which is 1%, 5%, or 10%, then H_0 is rejected which indicates that the data has been stationary.

Table 2. Augmented Dickey Fuller test results

Variabel	t-statistic				Prob.
	ADF	Critical Value			
		1%	5%	10%	
JKAGRI	-13,20889	-3,452911	-2,871367	-2,572078	0,00000
JKBIND	-12,23311	-3,452911	-2,871367	-2,572078	0,00000
JKCONS	-14,00098	-3,452911	-2,871367	-2,572078	0,00000
JKFINA	-14,30756	-3,452911	-2,871367	-2,572078	0,00000
JKINFA	-13,93912	-3,452911	-2,871367	-2,572078	0,00000
JKMISC	-14,04907	-3,452831	-2,871332	-2,572060	0,00000
JKMING	-14,21079	-3,452831	-2,871332	-2,572060	0,00000
JKPROP	-13,46249	-3,452831	-2,871332	-2,572060	0,00000

JKTRAD	-12,29255	-3,452831	-2,871332	-2,572060	0,00000

Table 3 is the best Autoregressive Integrated Moving Average (ARIMA) forecasting model based on the lowest Akaike Info Criterion (AIC) and Schwarz Information Criterion (SIC) values for each model parameter. To find out whether the temporary model that has been identified is suitable or not, it is necessary to estimate the parameters of the model by looking at the value of AIC and SIC. Models of the actual return data index JKAGRI, JKBIND, JKCONS, JKFINA, JKINFA, JKMISC, JKMING, JKPROP and JKTRAD that will be estimated are ARMA (1,1), ARMA (1,2), ARMA (2,1), and ARMA (2,2).

Table 3. ARIMA modeling

Variabel	Parameter	AIC	SIC
JKAGRI	ARMA(2,1)	-1,501850	-1,451231
JKBIND	ARMA(2,1)	-2,034614	-1,983995
JKCONS	ARMA(2,1)	-2,267472	-2,216853
JKFINA	ARMA(2,1)	-2,097273	-2,046654
JKINFA	ARMA(2,1)	-1,812915	-1,762296
JKMING	ARMA(1,1)	-1,563494	-1,512875
JKMISC	ARMA(1,2)	-2,103614	-2,052995
JKPROP	ARMA(1,1)	-1,655595	-1,604976
JKTRAD	ARMA(1,1)	-2,095689	-2,045070

Based on table 4, the results of the ninth test of the research index show that for the JKBIND and JKFINA index, the probability value is more significant than α (5%), meaning that both indexes are homoscedasticity or there is no ARCH effect. Whereas for the other seven indexes, the probability value is smaller than α (5%). It means that the other seven indexes are heteroscedasticity, or there is an ARCH effect on the forecasting model. The JKAGRI, JKCONS, JKINFA, JKMING, JKMISC, JKPROP, and JKTRAD indices can be continued with the ARCH model.

Table 4. Testing results of the ARCH effect

Variable	Obs*Squared	Prob. Chi-Square	Information
JKAGRI	24,51648	0,0000	ARCH Effect
JKBIND	3,577863	0,0586	No ARCH effect
JKCONS	9,422315	0,0021	ARCH Effect
JKFINA	0,430899	0,5115	No ARCH effect
JKINFA	23,05855	0,0000	ARCH Effect
JMING	7,577602	0,0059	ARCH Effect
JKMISC	11,37853	0,0007	ARCH Effect

JKPROP	43,63432	0,0000	ARCH Effect
JKTRAD	19,57811	0,0000	ARCH Effect

From the results of forecasting that have been done (Table 5), the JKAGRI index is predicted to experience a growth rate of return of 0.66% at the beginning of the forecasting period. The JKAGRI index recorded the highest growth rate of return in May 2020 at 1.75%. For the next forecasting period, namely, from August 2020 to December 2021, the JKAGRI index return rate's growth was stagnant at 0.58%.

The JKCONS index is predicted to experience a growth rate of return of 0.05% at the beginning of the forecasting period. The JKCONS index recorded the highest growth of 1.00% in July 2020 and stagnated until December 2021. The JKINFA index is predicted to experience a contraction of growth at -0.86% at the beginning of the forecasting period. In the following month, namely, in May 2020, the JKINFA index recorded a positive growth of 1.30% while being the highest during the forecast period. In August 2020 to December 2021, the growth of the JKINFA index return rate was stagnant at 0.75%.

The JKMISC index is predicted to experience a contraction of growth at -3.70% at the beginning of the study period and continue in May 2020 at -0.47%. In the following months, the JKMISC index recorded a positive rate of return growth. In June 2020, the JKMISC index growth was at 0.80%. In September 2020 to December 2021, the JKMISC index return rate's growth was stagnant at 1.05%. The JKMING index is predicted to experience a contraction of growth at -0.95% at the beginning of the study. In May 2020, the JKMING index experienced positive growth and was among the highest during the forecast period, which was 1.17%. In July 2020 to December 2021, the growth of the JKMING index return stagnant was 0.89%.

The JKPROP index is the only index experiencing the most extended contraction period during the forecasting period recorded from April 2020 to August 2020. The JKPROP index recorded a negative growth of -3.67% in April 2020 after continuing to record negative growth. The JPROP index was able to record growth positively in September 2020 and continues to fluctuate. In July 2021, the growth of the JKPROP Index return rate was stagnant at 0.69%. The JKTRAD index is predicted to experience a contraction of growth of -1.66% at the beginning of the study period. In May 2020 the JKTRAD index recorded a positive growth of 0.01%, in the following months, from July 2020 to December 2021, the JKTRAD index's growth experienced a stagnant growth of 0.14%. These results make the JKTRAD index the index with the lowest growth rate.

Indonesia is a unique market that is in an early stage of development (Sharma *et al.*, 2019). Many companies in Indonesia use capital expenditure to boost their market position. Capital

expenditure is also a significant predictor in predicting stock returns on the stock market (Li, Wang and Yu, 2020). The market character also gives great attention to both local and foreign investors (Kim and Yi, 2015; Piccotti and Schreiber, 2020). In an uncertain situation, foreign investors usually leave the domestic stock market and switch to safe investment instruments (Guzman, Ocampo and Stiglitz, 2018). All issuers should be proactive in conducting business activities so that the national economic curve will continue to grow positively, and the economy can accelerate faster (Zhao, Cao, Zheng, & Wang, 2020). Foreign investor confidence needs to be maintained to encourage investment in the capital market (Griebeler and Wagner, 2017). That could have an impact on the flow of foreign funds to re-enter Indonesia.

Table 5. Industrial sector forecasting results

Tanggal	JKAGRI	JKCONS	JKINFA	JKMISC	JKMING	JKPROP	JKTRAD
Apr-20	0,66%	0,05%	-0,86%	-3,70%	-0,95%	-3,67%	-1,66%
Mei-20	1,75%	0,85%	1,30%	-0,47%	1,17%	-2,08%	0,01%
Jun-20	0,57%	0,98%	0,80%	0,80%	0,85%	-1,07%	0,13%
Jul-20	0,51%	1,00%	0,73%	1,01%	0,90%	-0,43%	0,14%
Agu-20	0,58%	1,00%	0,75%	1,04%	0,89%	-0,02%	0,14%
Sep-20	0,58%	1,00%	0,75%	1,05%	0,89%	0,24%	0,14%
Okt-20	0,58%	1,00%	0,75%	1,05%	0,89%	0,41%	0,14%
Nov-20	0,58%	1,00%	0,75%	1,05%	0,89%	0,51%	0,14%
Des-20	0,58%	1,00%	0,75%	1,05%	0,89%	0,58%	0,14%
Jan-21	0,58%	1,00%	0,75%	1,05%	0,89%	0,62%	0,14%
Feb-21	0,58%	1,00%	0,75%	1,05%	0,89%	0,65%	0,14%
Mar-21	0,58%	1,00%	0,75%	1,05%	0,89%	0,67%	0,14%
Apr-21	0,58%	1,00%	0,75%	1,05%	0,89%	0,68%	0,14%
Mei-21	0,58%	1,00%	0,75%	1,05%	0,89%	0,68%	0,14%
Jun-21	0,58%	1,00%	0,75%	1,05%	0,89%	0,69%	0,14%
Jul-21	0,58%	1,00%	0,75%	1,05%	0,89%	0,69%	0,14%
Agu-21	0,58%	1,00%	0,75%	1,05%	0,89%	0,69%	0,14%
Sep-21	0,58%	1,00%	0,75%	1,05%	0,89%	0,69%	0,14%
Okt-21	0,58%	1,00%	0,75%	1,05%	0,89%	0,69%	0,14%
Nov-21	0,58%	1,00%	0,75%	1,05%	0,89%	0,69%	0,14%
Des-21	0,58%	1,00%	0,75%	1,05%	0,89%	0,69%	0,14%

Conclusion, Implication, Suggestions, and Limitations

The results of variance ratio testing show that the stock price returns of each industry sector in the Indonesia Stock Exchange do not follow a random walk, which means there is no relationship with the previous stock price. All the industrial areas studied are inefficient in a weak

form. Investors, especially domestic investors, can also exploit the Indonesian market's inefficiency because local investors in the Indonesian market have the advantage of information over foreign investors.

The best ARIMA modeling technique results are then used to find the best model on the ARCH modeling technique, which has been tested before whether there is an ARCH Effect or not. Then proceed with forecasting, where almost all indices experience a contraction of growth at the beginning of the forecasting period. Noted, only the JKAGRI index and JKCONS experienced positive return growth. The stakeholders are expected to be more active in the market by frequently buying and selling securities because the market is proven inefficient, and the market can be defeated.

References

Ahmar, A. S. and del Val, E. B. (2020) 'SutteARIMA: Short-term forecasting method, a case: Covid-19 and stock market in Spain', *Science of the Total Environment*. Elsevier B.V, 729, pp. 1–23. doi: 10.1016/j.scitotenv.2020.138883.

Audrino, F., Sigrist, F. and Ballinari, D. (2020) 'The Impact of Sentiment and Attention Measures on Stock Market Volatility', *International Journal of Forecasting*. Elsevier B.V., 36(2), pp. 334–357. doi: 10.1016/j.ijforecast.2019.05.010.

Barbash, F. (2002) *The Stock Market*. London: Chelsea House Publishers.

Bhattarai, K. (2016) 'Unemployment-Inflation Trade-offs in OECD Countries', *Economic Modelling*. The Author, 58, pp. 93–103. doi: 10.1016/j.econmod.2016.05.007.

Bouteska, A. and Regaieg, B. (2018) 'Investor Characteristics and the Effect of Disposition Bias on the Tunisian Stock Market', *Borsa Istanbul Review*. Borsa İstanbul Anonim Şirketi, 18(4), pp. 282–299. doi: 10.1016/j.bir.2018.05.004.

Byström, H. (2016) 'Language, News and Volatility', *Journal of International Financial Markets, Institutions and Money*. Elsevier B.V., 42, pp. 139–154. doi: 10.1016/j.intfin.2016.03.002.

Cai, W. and Lu, J. (2019) 'Investors' Financial Attention Frequency and Trading Activity', *Pacific Basin Finance Journal*. Elsevier, 58, pp. 1–20. doi: 10.1016/j.pacfin.2019.101239.

Chen, J. and Imam, P. (2013) 'Causes of Asset Shortages in Emerging Markets', *Review of Development Finance*. University of Cairo., 3(1), pp. 22–40. doi: 10.1016/j.rdf.2012.12.002.

Coşkun, Y. *et al.* (2017) 'Capital Market and Economic Growth Nexus: Evidence from Turkey', *Central Bank Review*, 17(1), pp. 19–29. doi: 10.1016/j.cbrev.2017.02.003.

Dong, H., Bowers, H. M. and Latham, W. R. (2013) 'Evidence on the Efficient Market Hypothesis from 44 Global Financial Market Indexes', *Economics Research International*, 2013, pp. 1–11. doi: 10.1155/2013/238253.

Frydman, C. and Camerer, C. F. (2016) 'The Psychology and Neuroscience of Financial Decision Making', *Trends in Cognitive Sciences*. Elsevier Ltd, 20(9), pp. 661–675. doi: 10.1016/j.tics.2016.07.003.

Gourène, G. A. Z. and Mendy, P. (2018) 'Oil Prices and African Stock Markets Co-movement: A Time and Frequency Analysis', *Journal of African Trade*. Elsevier B.V., 5(2), p.

55. doi: 10.1016/j.joat.2018.03.002.
Griebeler, M. de C. and Wagner, E. M. (2017) 'A Signaling Model of Foreign Direct Investment Attraction', *EconomiA*. National Association of Postgraduate Centers in Economics, ANPEC, 18(3), pp. 344–358. doi: 10.1016/j.econ.2017.04.001.
Gu, S., Kelly, B. and Xiu, D. (2020) 'Empirical Asset Pricing via Machine Learning', *The Review of Financial Studies*, 33(5), pp. 2223–2273. doi: 10.1093/rfs/hhaa009.
Guidi, F. and Gupta, R. (2013) 'Market Efficiency in the ASEAN Region: Evidence from Multivariate and Cointegration Tests', *Applied Financial Economics*, 23(4), pp. 265–274. doi: 10.1080/09603107.2012.718064.
Guzman, M., Ocampo, J. A. and Stiglitz, J. E. (2018) 'Real Exchange Rate Policies for Economic Development', *World Development*. The Authors, 110, pp. 51–62. doi: 10.1016/j.worlddev.2018.05.017.
Hamid, K. *et al.* (2010) 'Testing the Weak form of Efficient Market Hypothesis: Empirical Evidence from Asia-Pacific Markets', *International Research Journal of Finance and Economics*, 58(58), pp. 121–133. doi: 10.2139/ssrn.2912908.
Heywood, G. C., Marsland, J. R. and Morrison, G. M. (2003) 'Practical Risk Management for Equity Portfolio Managers', *British Actuarial Journal*, 9(05), pp. 1061–1123. doi: 10.1017/s1357321700004463.
Hu, Y. and Prigent, J. L. (2019) 'Information Asymmetry, Cluster Trading, and Market Efficiency: Evidence from the Chinese stock Market', *Economic Modelling*. Elsevier Ltd, 80, pp. 11–22. doi: 10.1016/j.econmod.2018.04.001.
Jebran, K. *et al.* (2017) 'Does Volatility Spillover among Stock Markets varies from Normal to Turbulent Periods? Evidence from Emerging Markets of Asia', *The Journal of Finance and Data Science*. China Science Publishing & Media Ltd., 3(1–4), pp. 20–30. doi: 10.1016/j.jfds.2017.06.001.
Kim, J. and Yi, C. H. (2015) 'Foreign versus Domestic Institutional Investors in Emerging Markets : Who Contributes more to firm-specific Information Flow ?', *China Journal of Accounting Research*. Sun Yat-sen University, 8(1), pp. 1–23. doi: 10.1016/j.cjar.2015.01.001.
Kudrin, A. and Gurvich, E. (2015) 'A New Growth Model for the Russian Economy', *Russian Journal of Economics*, 1(1), pp. 30–54. doi: 10.1016/j.ruje.2015.05.002.
Li, J., Wang, H. and Yu, J. (2020) 'Aggregate Expected Investment Growth and Stock Market Returns', *Journal of Monetary Economics*. Elsevier B.V., 13, pp. 1–21. doi: 10.1016/j.jmoneco.2020.03.016.
Li, T. (2016) 'Intra-industry Momentum and Product Market Competition Around the World', *Review of Development Finance*. University of Cairo., 6(1), pp. 16–25. doi: 10.1016/j.rdf.2016.02.001.
Liu, Y. and Yang, X. (2017) 'Asymmetric Synchronicity in Extreme Stock Price Movements: Evidence from China's Stock Market', *Procedia Computer Science*. Elsevier B.V., 122, pp. 1156–1161. doi: 10.1016/j.procs.2017.11.486.
Malini, H. (2019) 'Efficient Market Hypothesis and Market Anomalies of LQ 45 Index in Indonesia Stock Exchange', *Sriwijaya International Journal of Dynamic Economics and Business*, 3(2), p. 107. doi: 10.29259/sijdeb.v3i2.107-121.
Neanidis, K. (2019) 'Volatile Capital Flows and Economic Growth: The

Role of Banking Supervision', *Journal of Financial Stability*. Elsevier B.V., 40, pp. 77–93. doi: 10.1016/j.jfs.2018.05.002.

Phan, K. C. and Zhou, J. (2014) 'Market Efficiency in Emerging Stock Markets: A Case Study of the Vietnamese Stock Market', *IOSR Journal of Business and Management*, 16(4), pp. 61–73. doi: 10.9790/487x-16446173.

Piccotti, L. R. and Schreiber, B. Z. (2020) 'Information Shares in a two-tier FX Market', *Journal of Empirical Finance*. Elsevier Ltd, 58, pp. 19–35. doi: 10.1016/j.jempfin.2020.05.001.

Qin, N. and Singal, V. (2015) 'Indexing and Stock Price Efficiency', *Financial Management*, 44(4), pp. 875–904. doi: 10.1111/fima.12102.

Rajesh, R. *et al.* (2015) 'Efficiency of Sectoral Indices: A Comparative Study on BSE and NSE Ltd', *International Business Management*, 9(3), pp. 258–266.

Rizvi, S. A. and Arshad, S. (2016) 'How Does Crisis Affect Efficiency? An Empirical Study of East Asian Markets', *Borsa Istanbul Review*. Elsevier Ltd, 16(1), pp. 1–8. doi: 10.1016/j.bir.2015.12.003.

Roy, S. and Kemme, D. (2020) 'The Run-up to the Global Financial Crisis: A Longer Historical View of Financial Liberalization, Capital Inflows, and Asset Bubbles', *International Review of Financial Analysis*. Elsevier Inc, 69, p. 101377. doi: 10.1016/j.irfa.2019.101377.

Sánchez-Granero, M. A. *et al.* (2020) 'Testing the Efficient Market Hypothesis in Latin American Stock Markets', *Physica A: Statistical Mechanics and its Applications*. Elsevier B.V., 540, pp. 1–25. doi: 10.1016/j.physa.2019.123082.

Sewell, M. (2012) 'The Efficient Market Hypothesis : Empirical Evidence', *International Journal of Statistics and Probability*, 1(2), pp. 164–178.

Sharma, S. S. *et al.* (2019) 'Is Indonesia's Stock Market Different When it Comes to Predictability?', *Emerging Markets Review*. Elsevier, 40, pp. 1–11. doi: 10.1016/j.ememar.2019.100623.

Tuyon, J. and Ahmad, Z. (2016) 'Behavioural Finance Perspectives on Malaysian Stock Market Efficiency', *Borsa Istanbul Review*. Elsevier Ltd, 16(1), pp. 43–61. doi: 10.1016/j.bir.2016.01.001.

Uygur, U. and Taş, O. (2014) 'The Impacts of Investor Sentiment on Different Economic Sectors: Evidence from Istanbul Stock Exchange', *Borsa Istanbul Review*. Elsevier Ltd, 14(4), pp. 236–241. doi: 10.1016/j.bir.2014.08.001.

Zhao, J., Chen, X. and Hao, Y. (2018) 'Monetary Policy, Government Control and Capital Investment: Evidence from China', *China Journal of Accounting Research*. Sun Yat-sen University, 11(3), pp. 233–254. doi: 10.1016/j.cjar.2018.04.002.

Zhao, R. *et al.* (2020) 'The Innovation Economy Calls for Proactive Growth of Intellectual Property by Various Innovation Carriers – A China Case', *Global Transitions Proceedings*. Elsevier B.V., 13, pp. 1–24. doi: 10.1016/j.gltp.2020.04.001.

Efficient Market Hypothesis and Forecasting in the Industrial Sector on the Indonesia Stock Exchange

ORIGINALITY REPORT

6%	3%	4%	4%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Universitas Diponegoro Student Paper	1%
2	hdl.handle.net Internet Source	1%
3	Submitted to University of Greenwich Student Paper	1%
4	Lentina Simbolon, Purwanto. "The Influence of Macroeconomic Factors on Stock Price: The Case of Real Estate and Property Companies", Emerald, 2018 Publication	1%
5	Submitted to INTO Queen's University Belfast Student Paper	1%
6	www.coursehero.com Internet Source	1%
7	Francesco Guidi, Rakesh Gupta. "Market efficiency in the ASEAN region: evidence from multivariate and cointegration tests", Applied	1%

Financial Economics, 2013

Publication

Exclude quotes	On	Exclude matches	< 1%
Exclude bibliography	On		