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Article

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The Impact of Oil Price and Other Macroeconomic Variables on The Islamic and Conventional Stock Index in Indonesia

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ABSTRACT

The Islamic capital market plays an important role in the growth of the economy in Indonesia. During its development, the performance of the stock index in a country is often influenced by other stock indices in other countries. This study tries to analyze dependence of macroeconomic variable towards JII and IHSG price, using Autoregression Distributed Lag (ARDL). The results show that the Consumer Price Index (CPI) and exchange rate (EXC) significantly affect the movement of the JII and IHSG price index. This indicates that the movement of the JII and IHSG index in the short term is influenced by domestic production and exchange rate. Furthermore, the results of the research show a little uniqueness in the crude oil price (COP) variable and the issue of energy consumption in the future.

Keywords: ARDL, Macroeconomic, Oil Price, Islamic Stock
JEL Classifications: E44, F41, Q43

1. INTRODUCTION

The presence of the Islamic capital market in Indonesia plays an important role in the growth of the economy in this country. In the concept of economic growth, the capital market is one indicator of the stability of macroeconomic conditions where the capital market is an alternative source of financing for companies. In its development, the capital market acts as a place to raise capital. Meanwhile, from the public side, the Islamic capital market acts as an investment alternative to maintain the value of their currency. The advancement of the capital market in Indonesia occurs as people's knowledge increases about how to invest optimally and is supported by domestic economic conditions.

The emergence of sharia products in the capital market originated from a desire to accommodate the needs of Muslims who wish to

invest in sharia principles. This was the reason behind PT Danareksa Investment Management to launch Danareksa Syariah on July 3, 1997. Then on July 3, 2000, the Indonesia Stock Exchange in collaboration with PT Danareksa Investment Management launched the Jakarta Islamic Index (JII). Furthermore, Islamic investment products in the capital market continued to develop with the presence of Islamic bonds (sukuk), Islamic mutual funds, and the Sharia Securities List (DES) which later transformed into the Indonesian Sharia Stock Index (ISSI).

Investment in Indonesia is currently experiencing a fairly good development. This is indicated by the better performance of the Composite Stock Price Index (IHSG), LQ45, Jakarta Islamic Index (JII), and the Indonesian Sharia Stock Index (ISSI), which represent the actual conditions of the national Islamic capital market.

The figure 1 above explains that the existence of Islamic stocks is in great demand by investors, this is reflected in the number of Islamic stocks which always increase every year. Furthermore, the value of Islamic stock capitalization as shown by the Jakarta Islamic Index (JII) has an increasing trend every year. This shows that the performance of the Jakarta Islamic Index has increased quite well.

The figure 2 above explains the development of the JCI and JII indices from January 2010 to December 2019. From the graph above, it can be seen that the JCI and JII have strong ties, which is indicated by almost the same movements, such as in the period May 2015 to September 2015 where the two indices corrected deep enough before moving to rebound in the next period, then fluctuating from March 2018 to December 2018.

In its movement, the movement of the stock index almost always fluctuates. The fluctuations that occur in the stock index can be influenced by macroeconomic variables. Tangjitprom (2012) explains that there are macroeconomic variables that affect the rise and fall of the stock price index, which can be grouped into four groups. The first group reflects general economic conditions such as the level of employment and the industrial production index. The second group includes variables of interest rates and monetary policy. The third group of variables focuses on the price level, which can be the general price level and the inflation rate or the price of a major asset such as the price of oil. The last group is variables involving international activities such as exchange rates and foreign direct investment. Another research was conducted by Valcarcel (2012) which examined the relationship between stock prices and inflation in the US.

One of the macroeconomic variables that affect the rise and fall of the stock price index is the world crude oil price. Crude oil is considered a source of driving force for the prosperity of the country's economy and maintaining the operational system because every production, transportation and factory industry requires product development from crude oil to run smoothly (Arouri and Rault, 2012). At the end of 2019, the price of West Texas Intermediate (WTI) crude oil was US $ 58.85 per barrel. Crude oil prices are quite volatile, where the lowest point of WTI crude oil prices in the 2010 to 2019 period was 30.37 in February 2016, and the highest point occurred in April 2011 at a price of 109.75 US dollars per barrel (Figure 3). During this period also, there was a drastic decline in world crude oil prices from July 2014 to January 2015, where in July 2014 it was at 101.85 and continued to fall to 49.35 in January 2015. This occurred due to an abundant supply which was exacerbated by strong production. from OPEC and the United States. Prices have been slumping especially since December 4, when the Organization of the Petroleum Exporting Countries (OPEC) decided to oppose production restrictions, as members struggle to maintain market share (Tempo, 2016).

There have been several studies regarding the correlation between crude oil prices and stock indices in the last decade. Research from Alzyoud et al. (2018) shows that there is no cointegration between COP, exchange rates and stock market returns. The regression analysis shows that COP and exchange rates, and their variations, have a positive and significant effect on Canadian stock market returns. In addition, research from Anyalechi et al. (2019) shows

that changes in oil prices have a positive but insignificant impact on stock returns both in the long and short term. On the other hand, research from Arouri and Rault (2010) shows a negative relationship between oil prices and stock prices in the Saudi Arabian stock market. Therefore, this study intends to evaluate the relationship between macroeconomic variables and Islamic and conventional stock indices regarding whether these macroeconomic variables have a positive or negative impact on each other.

2. LITERATURE REVIEW

2.1. Stock
Stock/shares are defined as proof or certificate of ownership of a person or entity against the company that issued the securities, which can also be interpreted as the participation of investors as investors in a company, so that they have a claim on the company's income and assets (Harsono, 2013). Stocks are one of the most popular forms of investing. Shares are issued by companies to raise capital. Shares in the form of securities as proof of deposit of funds from investors to the company. Companies that issue shares to be owned by the public are called public companies (Go Public). The share trading mechanism is regulated by the Indonesia Stock Exchange (IDX) under the supervision of the OJK (Financial Services Authority). In investing, especially in stocks, there are two important things, namely the rate of return or return (return) and risk. Investors generally want a maximum return with minimum risk (Nastiti and Suharsono, 2012).

According to Rivai and Buchari (2013), in general, there are two categories of stocks that are generally known in stock trading, namely preferred stocks and common stocks. Preferred stocks have the right to claim against the earnings and assets in the company where they invest the funds, but they cannot have voting rights in the election of directors and company decisions. And if a company goes bankrupt, preferred shareholder claims will take precedence over payments over common shareholders. Meanwhile, common stock has voting rights in the election of directors and decisions relating to the company. The dividends received by owners of common shares may be greater than the owners of preferred shares.

2.2. Islamic Stocks
Sharia stocks are investment activities in the form of equity participation in companies that do not violate sharia principles in their activities (Heykal, 2012). According to Soemitra (2009), Islamic shares are shares issued by a company that has met the following requirements:
1. The type of business, goods or services provided and the contract and management method of the company that issues shares (issuer) or public company that issues sharia shares must not be contrary to sharia principles. Types of business activities that are contrary to sharia principles, among others:
   a. Conventional financial institutions (ribawi), including conventional banking and insurance
   b. Producers, distributors and/providers of goods or services that destroy morals and are harmful
   c. Conducting transactions with issuers which at the time of the transaction the company's debt level to the Ribawi financial institution is more dominant than its capital

d. Issuers or public companies that issue sharia shares are required to sign and comply with the terms of the contract in accordance with the sharia shares issued.

2. Issuers or public companies that issue Islamic shares are required to ensure that their business activities comply with sharia principles (Fatwa DSN No. 40/2003).

2.3. Stock Price Index

The stock price index is an indicator that shows stock price movements. The index serves as a trend indicator of the stock market that describes market conditions in certain conditions, both in active and sluggish conditions, the movement of the index is an important indicator for investors to determine whether they will sell, hold or buy a certain amount of shares (Rusbariand, et al. 2012).

In general, almost all countries have their own stock index. There are even some countries that have more than one stock index, such as in Indonesia which has the Composite Stock Price Index (IHSG), the Jakarta Islamic Index (JII), and the Indonesian Sharia Stock Index (ISSI). The United States has Dow Jones, Dow Jones Islamic Market US (IMUS), and NASDAQ.

2.4. Composite Stock Price Index (IHSG)

The Jakarta Composite Index or JSX Composite is a type of index on the Indonesia Stock Exchange. IHSG is to measure the performance value of all shares listed on a stock exchange by using all shares listed on the stock exchange as a component of the index calculation. JCI is used to determine the development and general situation of the capital market, not the situation of a particular company. This index includes the price movements of all common shares and preferred shares listed on the IDX.

According to Anoraga and Pakarti (2001), the IHSG is an index that shows general stock price movements listed on the stock exchange, which is a reference for the development of activities in the capital market. This JCI can be used to assess the general market situation or to measure whether stock prices have increased or decreased. JCI also includes all share prices listed on the stock exchange.

2.5. Jakarta Islamic Index (JII)

The Jakarta Islamic Index (JII) is one of the Islamic stock indices in Indonesia which is used as a measure of the performance of Islamic stocks. The Jakarta Islamic Index was introduced by the IDX and Danareksa Investment Management (DIM) on July 3, 2000 which aims to provide guidance to investors who wish to invest their funds in sharia. According to Hidayat (2011), shares that are included in the 30 shares of JII are stocks that meet the criteria, namely that the main type of business does not conflict with sharia principles and has been recorded for more than 3 months (unless included in the top ten capitalization), based on annual financial statements or mid-year has a maximum ratio of liabilities to assets of 90 percent, including into 60 shares of the stock composition based on the largest average market capitalization order during the past year, then entering into 30 shares in order based on the level of liquidity of the average regular trading value for one last year.

2.6. World Crude Oil Prices

Price is an exchange rate that can be equated with money or other goods for the benefits obtained from a good or service for a person or group at a certain time and place. Crude oil (crude oil) is a commodity and a source of energy that is needed for the growth of a country. Crude oil can be processed into an energy source, such as Liquified Petroleum Gas (LPG), gasoline, diesel, lubricating oil, fuel oil and others.

The World Crude Oil Price is measured from the spot price of the world oil market, generally used as standards are West Texas Intermediate and Brent. The world oil traded in West Texas Intermediate (WTI) is high quality crude oil. This type of oil is very suitable to be used as fuel, which causes the price of this oil to become the benchmark for world oil trade.

2.7. Autoregressive Distributed Lag (ARDL)

This study uses an estimation method with Autoregressive Distributed Lag (ARDL) analysis. The ARDL method is an econometric method that can estimate linear regression models in analyzing long-term relationships that involve cointegration tests between time series variables. The ARDL method was first introduced by Pesaran and Shin (1999) with a cointegration test approach with Bound Test Cointegration testing. The cointegration test in this method is carried out by comparing the F-statistic value with the F-table value compiled by Pesaran and Shin (1999).

Some of the literature regarding the cointegration test that can be used, such as Johansen, Engel-Granger, Phillips and Hansen, Phillips and Loretan, requires the need for the estimated variables to be integrated in the same level in order I (1) or first difference. To overcome this problem, Pesaran and Shin (1997) developed the ARDL method using Bound Testing Cointegration. According to Fosu and Magnus (2006), the ARDL method has several advantages compared to other econometric methods, namely:

1. The cointegration test is simpler than the Johansen-Juselius cointegration test. This is because the use of bound testing cointegration is sufficient to test the cointegration which is estimated using OLS when the lag of the model has been identified.
2. The bounds test procedure does not require unit root testing of the variables used in the study. This cointegration test can be applied to models where all the variables are stationary at I (0), I (1), or the integration of both (Pesar et al., 2001).
3. Testing with ARDL is relatively more efficient for small and limited data samples.

Estimation and identification of the ARDL model can use Ordinary Least Square (OLS) if the ARDL order has been determined (Pesaran et al., 2001). Furthermore, OLS can be used if several OLS assumptions that are binding on the related econometric estimates are met. An estimator that meets the Best Linear Un] Estimator (BLUE) is a requirement for an OLS estimation model that can be used as the basis for analysis. Meanwhile, some problems in violating OLS assumptions include: multicollinearity problems, heteroscedasticity problems, autocorrelation, and errors in functional specifications.

The steps in ARDL testing in this study are as follows (Dilla, 2014):

1. Stationarity test is done by using the Phillip Perron (PP) Test. The test hypothesis of the PP Test is as follows:
   H_0: $\delta = 1$; there is root unit/not stationary
   H_1: $\delta < 1$; no root unit/stationary unit

The test result criterion is to compare the t-statistical value of PP with the critical value of MacKinnon. If the t-statistic value of PP is smaller than the critical value of MacKinnon, the test result is rejecting H_0 which states the data is stationary at the level. If the test results show that the data used is not stationary at degree I (0) or level, then there are two possible ARDL models to be used. In the co-integrated data, the ARDL for Cointegration model is used, while the data without cointegration uses the first difference ARDL model.

2. To determine whether there is a cointegration relationship between non-stationary variables, a Bounds Test Cointegration is performed. Estimation of the equation is done using OLS by applying the F test which is intended to determine the existence of a long-term (cointegration) relationship between variables. This F test is used to see the joint test for long-term coefficients. The hypothesis being tested is:
   H_0: $\delta_1 = \delta_2 = 0$; no cointegration
   H_1: $\delta_1 \neq \delta_2 \neq 0$; there is cointegration

The test result criterion is to compare the F-statistic value with the critical value that has been compiled in the table by Pesaran and Shin (1999). In the ARDL Bounds Test, there are two asymptotic critical limit values for testing cointegration. The lowest critical value (lower critical value) assumes the regressor is integrated at I (0) while the highest critical value (upper critical value) assumes the regressor is integrated at I (1). If the F-statistic is above the highest critical value, then the null hypothesis about no cointegration or no long-term relationship is rejected. Conversely, if the F-statistic is below the lowest critical value, the null hypothesis is not rejected. If the F-statistic is between the lowest and highest critical values, there is no conclusion (Pesaran et al., 2001).

3. RESEARCH METHODS

This study uses a quantitative method of Autoregressive Distributed Lag (ARDL) followed by an Error Correction Model (ECM), if there is cointegration. Previously, the available data would go through several tests, namely the unit root test (stationarity) and the cointegration test. The time period used in this study is January 2010 to December 2019. The data used are monthly data taken from various institutions, especially the Indonesia Stock Exchange.

The data used in this study is secondary data in the form of monthly time series obtained from several sources such as the Indonesia Stock Exchange and Yahoo Finance. All data starts from the period January 2010 to December 2019. As the dependent variable, the Jakarta Islamic Index (JII) is an Islamic stock index which is a composite of 30 Islamic stocks that have the highest level of liquidity. In addition, the Composite Stock Price Index (IHSG) is a composite stock index of all issuers available on the Indonesia Stock Exchange (IDX). Furthermore, the independent variable used is the Consumer Price Index (IHK), the

Rupiah exchange rate against the USD. Industrial Production Index, WTI World Crude Oil Price (COP) Total Money Supply (JUB) or M2 and government bond yields with a tenor of 10 years.

4. RESULTS AND DISCUSSION

4.1. Stationarity Test
The test method used to test the stationarity of the data in this study is the ADF (Augmented Dickey Fuller) and Phillips-Perron test using the five percent real level. If the t-ADF and t-PP values are less than the critical value of MacKinnon, it can be concluded that the data used is stationary (does not contain a unit root).

This unit root test is carried out at the level up to the first difference. In the ADF test, the variables that reach stationary at the level are LN_IDX and LN_IPI. After the first difference is made, then all data are stationary at the real level of five percent. This means that the data used in this study are integrated in order one or can be abbreviated as I (1). Meanwhile, in the Phillips Perron test only the LN_IPI variable is stationary at the level, so the variables used only experience stationary at the first difference. The results of the unit root test can be seen in Table 1.

4.2. Cointegration Test
To determine the existence of cointegration in the model, namely by using the Bounds Testing Cointegration cointegration test method. The determination of the level of cointegration confidence based on the limits of critical value (critical value bounds) for the Bounds Testing Cointegration method as stated in Pesar et al. (2001). If the F-statistic value is below the lowest critical value (lower bound), it can be concluded that there is no cointegration in the model. If the F-statistic value is above the highest critical value (upper bound), it can be concluded that there is cointegration in the model. However, if the F-statistic is between the lower bound and upper bound, the result is inconclusive. The results of the cointegration test can be seen in Table 2.

Based on the results of the cointegration test on the two research models, all models are not cointegrated to the long run. This means that the estimation of the two models is carried out using the first difference or short term ARDL method.

4.3. Optimum Lag Test
Selection of the best ARDL model with an optimal lag combination, selected based on Akaike Information Criteria (SC). The optimum lag test results in Table 3 show that the two models have the same lag size in this study.

Table 1: Stationarity test results

Variable	ADF Value		Phillips-Perron Value	
	Level	1st Difference	Level	1st Difference
LN_JII	–3.177394	–11.32755	–3.091177	–11.40112
LN_IDX	–4.195763	–8.201633	–3.224484	–8.239732
LN_COP	–2.489252	–7.773195	–2.005571	–7.426494
LN_EXC	–2.358280	–8.703402	–2.166193	–8.655385
LN_IHK	–0.600488	–1.761104	–0.210170	–5.829564
LN_IPI	–10.52651	–12.78234	–10.51928	–23.96851
LN_MM2	–2.401181	–11.36489	–3.319532	–12.24385
YIELD	–2.622421	–8.241258	–1.899717	–8.134183

4.4. ARDL Model Estimation Results

Based on the short-term estimation results in the Table 4, it is known that in model 1 (JII) there are three significant variables, namely the variable itself (LN_JII) at lag 1 which has a significant effect on the five percent real level with a coefficient of −0.206. Then the exchange rate variable (LN_EXC) has a significant effect on the real level of one percent with a coefficient of −1.372. In addition, the Consumer Price Index (LN_IHK) variable has a significant effect on the real level of five percent with a coefficient of 1,672.

Next, the short-term estimation results in model 2 (IHSG) have two significant variables, namely the exchange rate variable (LN_EXC) which has a significant effect on the real level of one percent with a coefficient of -1.058. In addition, the Consumer Price Index (LN_IHK) variable has a significant effect on the real level of one percent with a coefficient of 2.123.

The findings in the two models above illustrate the strong relationship between Islamic and conventional stock indexes on currency exchange rates and the Consumer Price Index (CPI).

4.5. Findings

The results of this study indicate that the CPI has a positive correlation with the JII and IHSG stock indexes. These findings indicate that in the long run, an increase in the CPI (inflation) rate will increase the share price in each model. Stocks are generally considered to be a good hedge against inflation because of their
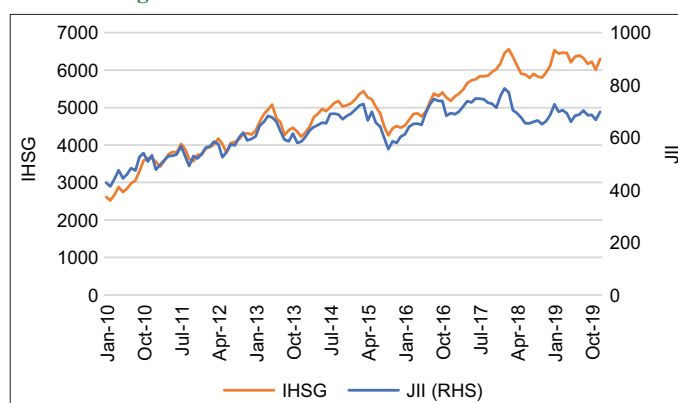
tendency to move together (Kumar and Tripathi, 2015). In addition, the findings from Valcarcel (2012) state that in theory, inflation can affect stock prices, either positively or negatively depending on the theory being considered. Gordon's (1962) growth model shows that stock prices are directly related to the growth rate of current and expected dividend returns, inversely related to the rate of return on equity required. Given this, inflation has a positive impact on stock prices in two ways: First, monetary easing that stimulates the economy together with inflation will have a positive

Figure 1: Number of Sharia Shares Period II and Stock Market Capitalization JII
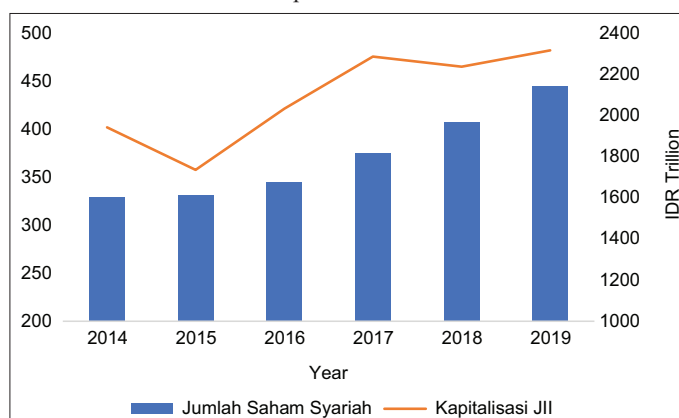
Source: Financial Services Authority (data processed)

Table 2: ARDL cointegration test results

Model	F-Statistic	Decision
Model 1 (JII)	1.067704	Not Cointegrated
Model 2 (IHSG)	2.297412	Not Cointegrated
Significance	**I(0) Bound**	**I(1) Bound**
10%	1.99	2.94
5%	2.27	3.28
1%	2.88	3.99

Table 3: ARDL optimum lag test results

Model	Lag optimum					
	LN_ JII	LN_ IHK	LN_ MM2	LN_ EXC	LN_ IPI	YIELD
Model 1 (JII)	1	0	2	0	0	0
Model 2 (IHSG)	1	0	2	0	0	0

Figure 2: JCI and JII Index Chart for 2010-2019

Source: Investing.com (data processed)

Table 4: ARDL short-term estimation results

Variable	Coefficient	
	Model 1 (JII)	Model 2 (IHSG)
D(LN_JII(−1))	−0.206069**	
D(LN_IDX(−1))		0.133720
D(LN_COP)	−0.004527	0.036639
D(LN_EXC)	−1.372666***	−1.058452***
D(LN_IHK)	−0.767395	−0.285644
D(LN_IHK(−1))	−0.136679	−0.651036
D(LN_IHK(−2))	1.671861**	2.123403***
D(LN_IPI)	0.070478	0.051826
D(LN_MM2)	−0.020169	−0.081169
D(YIELD)	−0.081507	−0.018856
C	0.001314	0.001839

***, and *significant at the real level of 1%, and 5%

Figure 3: WTI crude oil price chart for 2010-2019

Source: Investing.com (data processed)

impact on the dividend growth rate. Second, a monetary expansion that depresses bond yields will result in an increase in demand for equity, which in turn causes the average investor to lower the expected rate of return on equity.

The findings of this study indicate that in the long run, the relationship between the exchange rate and the JII index is positive, in accordance with the main theory linking the interaction between the foreign exchange market and the stock market: the flow-approach model (Dornbush and Fisher, 1980) and the stock model. approach (Branson, 1983; Frankel, 1983). In the stock-approach model, it is based on the assumption that exchange rates are determined by the supply and demand for financial assets, such as equities and bonds. These models can be divided into portfolio equilibrium models and monetary models. The portfolio balance model shows that there is a negative relationship between exchange rates and stock prices (Frankel, 1983; Branson and Henderson, 1985). In this model, individuals hold domestic and foreign assets, including currency in their portfolios. The exchange rate plays the role of balancing the demand and supply of assets. The increase in domestic share prices causes individuals to demand more domestic assets. To buy more domestic assets, local investors sell foreign assets which causes the local currency to appreciate. As a result, the relationship between share prices and exchange rates becomes negative.

Furthermore, the results of the above research show a little uniqueness in the crude oil price (COP) variable. This variable shows different results between the JII index and the IHSG index, where COP has a negative effect on JII while having a positive effect on the JCI. The results of the study showing that the COP variable has a negative effect on JII is in accordance with the research of Park and Ratti (2008), who analyzed the effect of oil price movements on the stock market in the United States and thirteen European countries between 1986 and 2005. They revealed that oil price fluctuations have a negative impact on the stock market. Theoretically, an increase in oil prices could increase income for oil exporting countries because it is expected to support foreign exchange earnings and build reserves in the short term. However, for an oil importer like Indonesia, rising oil prices may impact fiscal policy tendencies to be weighed down, limiting the government's ability to finance large import bills and meet other international obligations. The result can be detrimental to economic growth arising from an increase in domestic production costs and a decrease in aggregate demand (Onyeke et al., 2020).

On the other hand, the results show that the COP variable has a positive effect on the JCI in accordance with research from Aggarwal and Manish (2020) which states that there is a positive relationship between crude oil prices and Indian stock index in the long term. Higher oil prices, as a result of an unexpected global expansion, had a positive effect on stock returns. The volatility of oil prices can affect the sensitivity of changes in oil prices to the risk premium component of the discount rate and cash flows through demand-side consequences (Narayan and Narayan, 2010). In addition, Kollias et al. (2013) suggest that investors may associate rising oil prices with booming economies. Thus, higher oil prices could reflect stronger business performance and have an impact on the stock market.

The relationship between world crude oil prices to the JII and JCI indices has different directions, but the above results show that the relationship between COP and the JII stock index and JCI is not significant. Akoum et al. (2012) stated that the Indonesian stock market is not affected by fluctuations in crude oil prices even though Indonesia is a producer of crude oil, this is because industrialization and rapid population growth have forced the government to import oil from the international oil market, so that it does not affect the stock price index so much. In addition, the price of petroleum can affect the stock market in a country either positively or negatively depending on the fluctuation of the crude oil market (Arouri et al., 2011), so the direction of the relationship between crude oil prices and the stock index depends on the study period.

5. CONCLUSION

Based on the results of research that has been conducted regarding the influence of macroeconomic variables on two research models; JII and IHSG, several conclusions were obtained, namely: There is no long-term co-integration of the Jakarta Islamic Index (JII) and the Composite Stock Price Index (IHSG), so the estimates in these two models only use the short-term model.

In the short term, the exchange rate and the Consumer Price Index (CPI) significantly influence the price movements of the JII and JCI indexes. This indicates that the movement of the JII and JCI indexes in the long term is influenced by the fluctuation of the Rupiah exchange rate against the US Dollar. In addition, the movement of these two indices is also influenced by inflation (represented by the CPI).

The recommendations that the author can give are: For investors, it is advisable to be more critical in analyzing the factors that influence the movement of the JII and JCI. Investors can look for information related to external factors that affect market conditions, such as macroeconomic variables. This information can help investors to make investment decisions and predict the right time to sell or buy shares on the stock exchange.

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