Does Foreign Interest Rate Determine Islamic Stock Prices?

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Abstract

This paper aims to investigate whether foreign interest rate determines Islamic stock prices vis-à-vis domestic interest rate. The method applied is the Autoregressive Distributed Lag (ARDL) model to Indonesian data from January 2008 to June 2018. The study found a long-run negative relationship between foreign interest rate with both Islamic and conventional stock prices. Additionally, foreign interest rate is more important than domestic interest rate in determining the price of both types of stocks. Although Islamic stocks are affected by foreign interest rate dynamics, they are less responsive to changes of the Libor than conventional equities. In addition, it is found that GDP, money supply and real exchange rate has a long-run positive relation with both stock price. Thus, although Islamic equity prices are not insulated against foreign interest rates, they are less responsive to international financial markets movements than conventional stocks. For policy, authorities should pay close attention to foreign interest rate dynamics. While policy makers and fund managers in a dual capital market can use Islamic stocks to provide cushion against dynamics of international funds market.

Keywords: Islamic Stocks; Conventional Stocks; foreign interest rates; Co-integration.

1. Introduction

Prior to 2017, as the world economy is recovering from the 2008 global financial crisis and the 2012 European financial crisis, the United States plus other advanced economies are in the path of gradual monetary policy tightening. This result in a rise of foreign interest rates faced by open economies. However, drastic macroeconomic policy changes of The US under the Trump administration tends to loosen the Federal Funds Rate (Conti-Brown, 2018). The monetary policy loosening of the United States and the fall of the Federal Funds Rate is reinforced with the advent of the Covid-19 pandemic. The oscillations of foreign interest rates would have significant implications on global financial system, in particular the stock markets.

Stock markets dynamics have important implications towards macroeconomic conditions of a nation. In fact, the performance of the stock market exerted influence on economic growth in developed countries such as in Europe (Boubakari & Jin, 2010). Similarly, stock market movements affected large Asian economies such as China (Pan & Mishra, 2018).

Indonesia is the world's largest Muslim country, thus in addition to conventional stock market, there are Islamic stock markets; the Jakarta Islamic Index (JII) and the Indonesian Islamic Stock Index (ISSI) (Mai, Syarief, & Kristianingsih, 2021). Transactions in the Islamic stock markets are different from transactions in the conventional stocks, where each financial transaction on the Islamic stock markets must comply with the basic rules of trade that have been determined by Islamic law. Particularly, Islamic law provides clear guidelines that financial transactions involving interest rates (*riba*), excessive uncertainty (*gharar*) and gambling (*maysir*) are strictly prohibited. Trade is also not permitted for unlawful (haram) goods based on Islamic law (Asri, Ernawati, & Nusantara, 2021). The JII experienced significant advancement in the period, which in 2000, the value of the index was roughly 58, while in 2017 it became about 760.

There are growing studies that analyzed the relation between macroeconomic variables and stock markets dynamics. An example is a study which examined this relation for Brazil, Russia, India, China and South Africa (Chkili & Nguyen, 2014). There was also an analysis which investigated the effect of money supply on Islamic stock prices in developed economies and emerging markets (Bahloul, Mroua, & Naifar, 2017).

There were studies which explored the relation between domestic interest rates with conventional plus Islamic stocks dynamics. An example was an analysis which explored the influence of domestic interest rate on the conventional stock market in Latin America (Abugri, 2008). While there were studies which investigated the possibility of influence of domestic interest rate with regard to price of Islamic equities in The United States ((Ajmi, Hammoudeh, Nguyen, & Sarafrazi, 2014). While (Bahloul et al., 2017) analyzed the relation between domestic interest rates and Islamic stock indices in developed and emerging countries.

There are limited literature which discussed the effect of foreign interest rate on conventional stock and Islamic markets. (Abugri, 2008) analyzed the effect of foreign interest rate on conventional stock prices in Latin America. While there were studies which investigated the relationship between foreign interest rate (using the Federal Fund Rate as proxy) in Islamic stock market index in Malaysia ((Majid & Yusof, 2009) and (Mustafa, Ramlee, & Kassim, 2017)). Yet, these studies did not analyze whether domestic interest rate or foreign interest is more important in determining Islamic stock prices.

From arguments above, to the best of our knowledge, there does not exist enquiries which investigated whether domestic interest rate or foreign interest was more important in determining Islamic stock prices. Thus, the objective of this paper is to fill the gap in the literature by investigating whether foreign interest rate is a significant determinant of the movement of Islamic stock prices compared to domestic interest rate, by exploring data for Indonesia. To the best of our knowledge, this is the first paper which investigates such issue, especially for Indonesia. This paper contributes to the relatively sparse literature on the importance of foreign interest rate vis-a-vis domestic interest rate on Islamic capital markets. The remaining part of the study are, section 2 presents a literature review, section 3 presents empirical framework, while Section 4 elaborate the findings and their implications. Lastly, Section 5 concludes the paper and provides policy recommendations.

2. Literature Review

There is a large set of literature which investigated macroeconomic determinants of conventional stock markets., but some of the results were still ambiguous. For example, (Chkili & Nguyen, 2014) found that exchange rate movements had no significant effect toward stock markets returns within BRICS countries (Brazil, Russia, India, China plus South Africa). However, (Mustafa et al., 2017)

found a positive relationship between real exchange rate with Islamic Stock prices in Malaysia. While (Ayopo, Isola, & Olukayode, 2016) which Enquired the relation concerning GDP with stock prices found a positive relationship between GDP and conventional stock prices in Nigeria. While (Hussin, Fidlizan, Mohd Fauzi, & Awang, 2012) found a positive relation involving the index industrial production (a monthly proxy for GDP) with Islamic stock exchange movements in Malaysia. Whereas Money supply, (Mustafa et al., 2017) found a positive relation between money supply and returns of Islamic stock prices in Malaysia. However (Osamwonyi & Evbayiro-Osagie, 2012) found a significant negative relation between money supply and stock prices in Nigeria. According to this paper the negative relation is due to the historically high inflationary effect of money supply that the country had.

There was analysis which investigated the relation between domestic interest rate with conventional and Islamic stock prices. In general these studies found a negative relationship between domestic interest rate and stock price. (Abugri, 2008) found a negative and significant relationship between domestic interest rates and stock market returns in Latin America. Similarly (Bekhet & Matar, 2013) revealed a negative relation between domestic interest rates with stock prices in Jordan. Additionally, (Peiró, 2016) found a negative and statistically significant relation involving domestic interest rate with price of stocks in France, Germany plus the United Kingdom. (Ajmi et al., 2014) found that the Dow Jones index for Islamic equities Market was affected by domestic interest rates (the Federal Fund rate).

There were still limited literature which discussed the effect of foreign interest rates on conventional and Islamic stock markets. (Abugri, 2008) uncovered a negative and statistically significant relationship involving foreign interest rates with returns of stock markets in Latin America. (Majid & Yusof, 2009) found a positive relation between foreign interest rate with returns of Islamic stock prices in Malaysia. On the contrary, (Mustafa et al., 2017) found a negative relation between foreign interest rate and returns of Islamic stock prices in Malaysia. However, in addition to the mixed results, these studies did not analyze whether domestic interest rate or foreign interest is more important in determining Islamic stock prices.

Based on the review, there were considerable research which investigated macroeconomic determinants of conventional stock prices, explored the relation involving foreign interest rate with price of conventional stocks, and examined the nexus between foreign interest rates and Islamic stock prices. However, there is yet to be a study which analyze whether domestic interest rate or foreign interest rate is more important in determining Islamic stock prices.

3. Methodology

The data used in this study are monthly data for Indonesia for the period starting from January 2008 up to June 2018. The span of the data was chosen based on the availability of data. The empirical method used in the current enquiry is the Autoregressive Distributed Lag (ARDL) model proposed by (Pesaran, Shin, & Smith, 1999).

The ARDL model used in this analysis consists of six variables. The six variables are gross domestic product (GDP) (using industrial production index as proxy), money supply (MS) (using M1 as proxy) which is measured as a seasonally adjusted index based on 2015=100 (OECD, 2023), real exchange rate (RER) which is measured as a seasonally adjusted index based on 2015=100 (Federal Reserve, 2023), domestic interest rate (IR) in percent, foreign interest rate (taking the Federal Funds rate as proxy (FED) measured in percent, which follows (Majid & Yusof, 2009) and (Mustafa et al., 2017)), Jakarta Composite Stock Index or Jakarta Islamic index (Stocks). Data on industrial production was obtained from OECD data base, MS, RER and IR were obtained from Bank Indonesia, stock indices data was obtained from The Financial Services Authority of The Republic of Indonesia (OJK), while data on FED was downloaded from The Federal Reserve Economic Database (FRED). Except for domestic interest rates and foreign interest rates, all variables are

written in natural logarithms. Choice of variables in this study follows (Majid & Yusof, 2009). Equations 1 represents of the conventional stock and Islamic stock market index being a function of the macroeconomic variables employed in the analysis.

$$\ln Stocks_t = b\ln GDP_t + c\ln MS_t + d\ln RER_t + f\,IR_t + g\,FED_t + \varepsilon_t \quad (1)$$

Before estimating the model, test for unit root is initially performed to ascertain the degree of integration of each variable. The next step is estimating co-integration and equilibrium long-run relationship (if it exists). In addition, a dynamic error correction framework (ECM) representation can be obtained from the ARDL model. ECM combines short-term dynamics with long-run relations. The ARDL model in ECM representation is as follows.

$$\Delta\ln Stocks_t = \sum_{j=0}^{k_1} b_j \Delta\ln GDP_{t-j} + \sum_{j=0}^{k_2} c_j \Delta\ln MS_{t-j} + \sum_{j=0}^{k_3} d_j \Delta\ln RER_{t-j} + \sum_{j=0}^{k_5} f_j \Delta\,IR_{t-j}$$
$$+ \sum_{j=0}^{k_6} g_j \Delta\,FED_{t-j} + n_1 \ln GDP_{t-1} + n_2 \ln MS_{t-1} + n_3 \ln RER_{t-1} + n_5 IR_{t-1}$$

After choosing the optimal lags for the model, estimation results can be calculated. Subsequently test for co-integration was performed using the Bound test Procedure proposed by (Pesaran et al., 1999) . Given a co-integration relationship, the speed of adjustment to long-run equilibrium is measured by the value of the error correction term (ECT). The final step is testing for the stability of the estimated ARDL model by performing structural stability tests. The test of structural stability is carried out by using the cumulative number of recursive residuals (CUSUM) plus the cumulative number of recursive residual squares (CUSUMSQ).

4.   Results And Discussion
4.1. Stationarity tests (Unit Root Test)

Stationary test is performed to ascertain the degree of integration for the data used in the analysis, and thus the appropriateness of applying the ARDL method. Stationary tests employed in this study are the Augmented Dickey-Fuller (ADF), Phillips-Peron (PP) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) Tests.

Table 1. Stationarity test

Variable	ADF		PP		KPSS	
	At levels	1st difference	At levels	1st difference	At levels	1st difference
LnIHSG	0.77	-8.32***	-1.06	-8.37***	1.1***	0.063
LnJII	-1.13	-8.60***	-1.56	-8.70***	1.0***	0.071
LnGDP	-0.42	-11.7***	-0.88	-17.1***	1.4***	0.075
LnMS	-0.47	-10.7***	-0.23	-8.84***	1.3***	0.109
LnRER	-2.46	-8.88***	-2.25	-8.92***	0.286	0.066
IR	-2.26	-5.06***	-1.74	-5.62***	0.52**	0.056
Fed	-6.88***		-5.29***		0.251	

note: ***, ** and * are 1 percent, 5 percent and 10 percent levels of significance.
Source: authors' calculations

Table 1 depicts, with the exemption of foreign interest rate, that the variables used in this study are non-stationary at levels, but they are stationary at the first difference. While Table 1 shows that foreign interest rate is stationary at levels. These results imply that foreign interest rates are of zero order of integration (I(0)), while all the other variables are of integration of order one (I(1)). The differences in orders of integration of the variables confirms the appropriateness of the ARDL framework for this analysis (Pesaran et al., 1999).

4.2. Estimation Results

Prior to estimation of the ARDL model, suitable lag length must be selected. Following (Mustafa et al., 2017), optimal lag length is selected using the Akaike Information Criterion (AIC). Furthermore, the results satisfied the classical assumptions (table 2).

Macroeconomic variables affect both Islamic and conventional stock prices. From the table 2 it is shown that industrial production (a proxy for monthly GDP) has a positive relation on both the conventional and Islamic stocks in the long-run. This results is in line with the finding of (Ayopo et al., 2016) and (Peiró, 2016) for conventional equities, whereas for Islamic stocks it is consistent with the findings of (Hussin et al., 2012) and (Mustafa et al., 2017). While the real exchange rate is positively related with stock prices and is in agreement with the findings in the literature. Similarly, money supply is positively related with both types of stock prices, which is coherent with the evidence in the literature. While foreign and domestic interest rates are negatively related to stock prices

Tabel 2. Long run Estimate

	Fed		Libor overnight	
	Conventional	Islamic	Conventional	Islamic
Fed	-0.228***	-0.245***	-0.341***	-0.250***
IR	-0.021	-0.036*	-0.07***	-0.045**
IPI	0.685	0.846**	1.22*	0.840**
MS	0.605***	0.288*	0.435	0.296*
RER	0.599**	0.343**	0.32	0.356*
Cointeq$_{t-1}$	-0.274***	-0.412***	-0.216***	-0.387***
ARDL Bound Test	6.57***	8.14***	15.16***	7.73***
Normality Test	3.33	3.93	2.83	3.26
Autocorrelation Test	0.02	0.18	1.90	0.02
Heteroskedasticity Test	0.68	0.74	0.74	0.73

note: ***, ** and * are 1 percent, 5 percent and 10 percent levels of significance
Source: authors' calculations

5. Discussion.

Domestic interest rate is negatively related with conventional stock prices. As shown in Table 2 there is a negative long-run equilibrium relationship between domestic interest rate and conventional stock prices, although not statistically significant. This results is in confirmation with the findings of (Abugri, 2008) , (Bekhet & Matar, 2013), (Osamwonyi & Evbayiro-Osagie, 2012) and (Peiró, 2016). The argument for this result is that an increase in domestic interest rate results in increased cost of borrowing funds, which in turn reduces firms' profitability. Ultimately this would dampen the firms' stock prices (Osamwonyi & Evbayiro-Osagie, 2012). Another argument for the above result is by employing the Arbitrage Pricing Theory (APT). An increase in domestic interest rates would increase the discount rate, which results in lower present value of expected future dividends of the firm. Ultimately this would reduce the price of equity for the firm (Peiró, 2016). Additional argument for

this results is that a rise of domestic interest rate increase the attractiveness of other assets such as bonds, and it also increase the opportunity cost of holding money which ultimately reduces price of equities (Mustafa et al., 2017).

Domestic interest rate is also negatively related with Islamic stock prices. From table 2 it is also shown that Islamic equity prices have a long run negative relationship with domestic interest rate. Although this result run counter with a principle of the Islamic financial system of prohibition of interest rate (*riba*), it should be noted that these equities are also purchased by investors who do not necessarily adhere to Islamic principles. This would explain the significant relation between domestic interest rate with Islamic stock prices found by (Mustafa et al., 2017).

Foreign interest rate is an important determinant for both conventional and Islamic stock prices. Following (Majid & Yusof, 2009) and (Mustafa et al., 2017), the foreign interest rate used in this analysis is the Federal Funds rate. As shown in Table 2, there is a negative long run equilibrium relationship between foreign interest rates and conventional stock prices. This result is in line with the findings by (Abugri, 2008) and (Mustafa et al., 2017). The argument of this result is that a rise of foreign interest rates would induce capital outflow from the domestic economy which leads to dampening of domestic stock prices (Abugri, 2008). In addition, table 2 also shows that there is a significant negative long run relationship between foreign interest rate with Islamic equity prices. This finding is along the lines of the result of (Mustafa et al., 2017) for the case of Malaysian Islamic Stock Exchange. The argument for this result is that investors of Islamic stocks are both domestic and foreign investors who do not necessarily adhere to the Islamic principles of the prohibition of interest rate (*riba*). Moreover, investors have a choice between investing in Islamic or conventional equities, or on other domestic and foreign assets. A rise in foreign interest rate would induce domestic and foreign investors to substitute away from domestic assets and purchase foreign assets in expectation of higher returns. This ultimately drives down the price of domestic Islamic stocks (Mustafa et al., 2017).

The current study also found that foreign interest rate is significantly more important than domestic interest rate in determining stock prices. Comparing the magnitudes of the first and second row of Table 2 it is shown that the coefficient of long run relationship between foreign interest rates and conventional stock prices is almost eleven times that of the relationship between domestic interest rate with conventional equities price. Likewise, by comparing the two rows, the coefficient of long run relationship between foreign interest rate with Islamic stock prices is almost seven times that of the relation between domestic interest rate with Islamic stock prices. This result implies that foreign interest rate is significantly more important in determining stock prices than domestic interest rate. Additionally, the empirical evidence implies that Islamic stock prices are moderately impinged by domestic interest rate, but it is highly affected by foreign interest rate movements. This imply that Islamic equities are not insulated from movements of domestic interest rates, and more importantly from movements of international interest rates, and thus both conventional and Islamic stocks are largely influenced by global market fluctuations. This interpretation to some extent is in line with the findings of (Ajmi et al., 2014) and (Umar, Shahzad, Ferrer, & Jareño, 2018).

Using an alternative foreign interest rate also shows that Islamic stock prices are not free from foreign interest rate, and that foreign interest rate is more important than domestic interest rate. As a robustness check, an alternative foreign interest rate (the overnight LIBOR) was used in the analysis. The estimation result shows that the finding of a negative long run relationship between foreign interest rate with Islamic stock prices plus conventional stock prices still persist. Similarly, the finding of the importance of foreign interest rate vis-à-vis domestic interest rate in determining long run dynamics of Islamic and conventional stock prices also still holds with the alternative foreign interest rate measure. Thus, the result that both conventional and Islamic stock prices are more prone to the dynamics of foreign interest rate and thus global market fluctuations, is still retained with the alternative foreign interest rate.

Islamic stock prices are less responsive to movements of the Libor than conventional stock prices, thus Islamic stocks can provide some cushion against fluctuations in the international funds market. Although both the Libor and the Fed Funds rate affect the prices of Islamic stocks and conventional stocks, the influence of the different foreign interest rates toward stock prices vary. The results from using Feds funds rate in the model shows that the influence of foreign interest rate is approximately similar with price of conventional stocks as with price of Islamic stocks. However, for conventional stock prices, table 2 reveals that the absolute value of the foreign interest rate coefficient for the Libor in determining conventional stock prices is nearly 50 percent higher than the coefficient for the Fed Funds rate. While for the price of Islamic stocks, the difference between the coefficient for the Libor with the Fed Funds rate is only approximately 2 percent. Thus, this result Imply that conventional stock prices are more responsive to changes of the Libor than to changes in the Fed Funds rate. As a note, The Fed Funds rate is the main instrument for monetary policy of the Federal Reserve, thus the Fed Funds rate is determined by monetary policy of the Federal Reserve through their FOMC meetings (Friedman & Shachmurove, 2017). Whereas the Libor is a benchmark interest rate for lending among international banks, particularly banks in Europe (Anaraki, 2019). Unlike the Fed Funds rate, the LIBOR is determined by the forces of supply and demand in the international funds market (Blokhin, 2019). Therefore, the results imply that Islamic stock prices are less prone to changes of the Libor compared to conventional stock prices. Hence, Islamic stocks can provide some cushion against shocks to the international funds market as compared to conventional stocks.

4.3. Stability test and Error Correction

For test of stability of the model, the CUSUM test and the CUSUMQ test is employed. The results of the tests are shown in Figures 1, 2. From the figures it can be seen that both conventional and Islamic stocks markets for the Fed Funds rate remained within the five percent confidence level (red line). This implies that the estimates of the ARDL model is stable.

Figure 1: Stability test of Conventional Stock Market with Fed Funds Rate
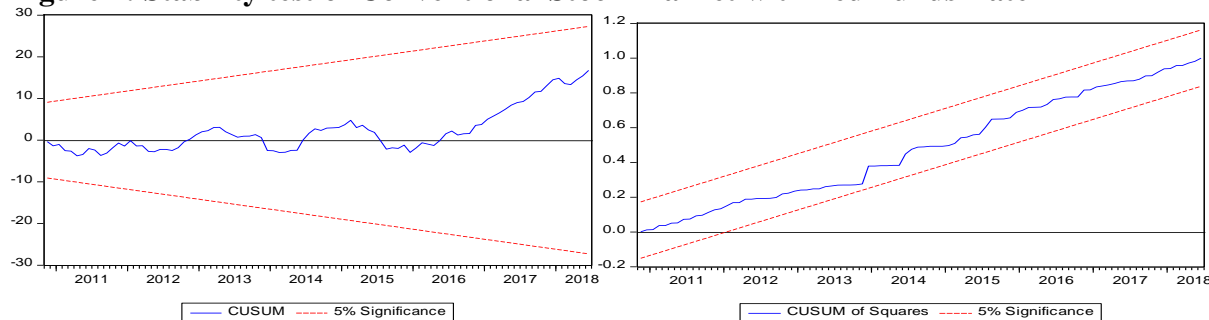
Source: authors' calculations

Figure 2: Stability test of Islamic Stock Market with Fed Funds Rate
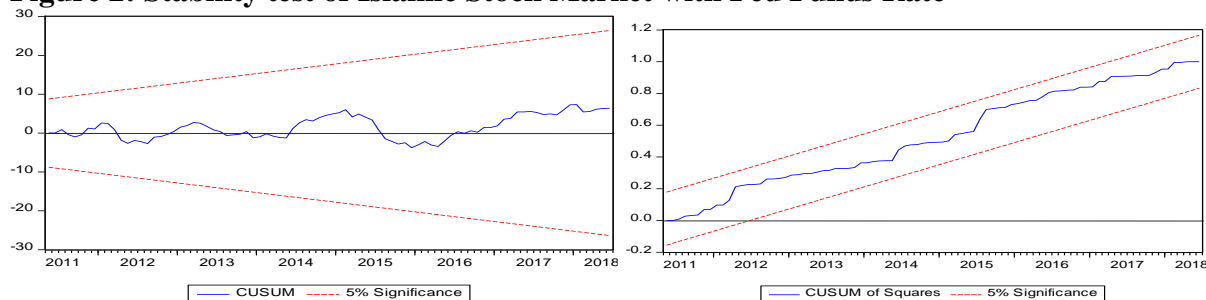
Source: authors' calculations

As a final note, the result from the error correction representation of the ARDL model shows that the error correction term coefficient is negative (-0.142 for conventional stocks and -0.225 for

Islamic stocks) and is significant at 1 percent level of significance. This magnitude shows that the equilibrium long run relationship is stable, in the sense that any disequilibrium is temporary and gets corrected over the period of time with the speed of correction is approximately 14 percent per month for conventional stock prices, and roughly 23 percent for Islamic stock prices.

5. Conclusion

Employing the ARDL model and data for Indonesia as a case study reveals a long run negative relationship between foreign interest rate with Islamic and conventional stock prices. The analysis also found that domestic interest rate is negatively related with prices of both types of stocks. This result indicates that Islamic stocks are not insulated against foreign interest rate movements, in contrary to Islamic financial system principles. Furthermore, the estimation results show that foreign interest rate is the more important determinant of the prices of both types of stocks compared to domestic interest rate. This finding highlight that not only does foreign interest rate influences Islamic stock prices, it also has a stronger influence on the equity prices as compared to domestic interest rate. Additionally, it is found that the price of Islamic stocks is less influenced by the movements of the overnight Libor compared to conventional stock prices. This result imply that Islamic stock prices are less prone to changes of the international funds markets vis-à-vis conventional stocks. Policy recommendation for the results is, authorities and policy makers in charge of managing the stability of the financial system, particularly the Stock Exchange. For the business sector, financial practitioners should pay close attention to the dynamics of foreign interest rate. Particularly for open economies with dual equity market system, Islamic stocks can provide some cushion against shocks to the international funds market. This underline the importance of a dual financial market in supporting financial stability in the economy.

Author contribution statement

The Jakarta Islamic index was established in July 3, 2000. author contributions, providing empirical evidence that Islamic stocks, can provide a cushion the against dynamics of international funds market.

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