THE INFLUENCE OF COMMODITY MURABAHAH TRANSACTIONS ON THE ISLAMIC FOREIGN EXCHANGE OPTION PRICE: EMPIRICAL EVIDENCE FROM A DUAL BANKING SYSTEM

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ABSTRACT

In a setting of a dual banking system, the study aims to provide empirical evidence on the establishment of the link between the pricing of Islamic foreign exchange option and the commodity murabahah trading as reflected through Crude palm oil trading volume from the derivatives market in Malaysia. The study made use of weekly data from January 2012 until December 2016 of the Malaysian derivatives market. The data set was obtained from the Bloomberg database and the annual report of Bursa Suq al-Sila'. This study employed the Autoregressive Distributed Lag (ARDL) approach to co-integration. Findings shows that there is no indication to establish the link between commodity murabahah transactions through Crude palm oil trading volume with variation of Islamic foreign exchange option price. The determination of Islamic foreign exchange option price has been dominance by the competitive market practices and leveraging the existing framework, in particular in a setting of dual banking system. The study provides empirical evidence on the price determination of the Islamic foreign exchange option from a dual banking system and emerging market.

Keywords: Islamic Derivatives; Risk Management; Hedging Instrument; Malaysia

INTRODUCTION

The significant growth of cross border activities and a complexity of financial transaction have increased demand of hedging instruments to mitigate financial risks in the Islamic derivative market. The growing needs for an alternative of hedging instruments due to complex domestic and international financial transactions and high volatility in the foreign exchange market. Generally, hedging is an effort to manage and minimize risks (Coyle, 2000). The concept of hedging is widely used in conventional and Islamic derivative market. Hedging denotes for an investment to reduce the risk of contrary price movements in an asset by taking opposite position to offset earlier position of an asset (Clark & Ghosh, 2004). Hedging is seen as a way to provide a cost-effective tool in order to manage the risk of price movements (Gurusamy, 2004).

Islamic financial market has over 300 Islamic financial institutions worldwide across 75 countries. In 2016, Bank Negara Malaysia showed that financial derivative assets grew from RM10,501,000 in 2012 to the figure of RM49,911,000 in 2016. The tremendous growth is also

seen for the financial derivative liabilities which was at RM10,920,000 in 2012 to reach RM40,635,000 in 2016. The financial derivatives assets and financial derivatives liabilities have grown tremendously. It shows that there is a huge demand for financial derivatives including the Islamic derivatives in Malaysia. There is emerge demand for the hedging instruments to alleviate and diminish the risk of market fluctuation particularly the foreign currency exchange rate risk or also known as currency risk (BNM, 2010). The currency risk refers to the changes in the price of foreign currency exchange that might result in a loss to a bank or companies if it is not properly hedged (Nordin et al., 2014).

In Malaysia, the development of Islamic derivative has emerged in 1995, since the passing of the resolution that granted usage of call warrants by Shariah Advisory Council of Securities Commission. However, debates and concerns on Shariah implementation towards derivative transactions remain varied due to diverse interpretations by different school of thoughts (mazhabs). For example, most Middle Eastern countries do not recognize the option as Shariah compliant. As such, the development of Islamic derivative is very limited within that region previously (Dusuki, 2009). However, in the year 2010, another milestone to a more acceptable Islamic derivatives transactions is available the global Islamic finance landscape. Subsequently, the Tahawwut Master Agreement (TMA) has been introduced to accelerate acceptance of Islamic derivatives especially among the Islamic countries. It was released by a joint effort of the International Swaps and Derivatives Association (IS-DA) and International Islamic Financial Market (IIFM) (McMillen et al., 2012). It provides worldwide standardized documents on derivative transactions for over-the-counter products that comply with Shariah principles. Prior to the TMA, Islamic Derivatives Master Agreement (IDMA) was widely accepted as the standard document for derivative transactions. However, IDMA was slowly replaced by the TMA for derivative transactions in Malaysia since the release in 2010 (Yanpar, 2012). In order to provide good governance market practices for Islamic derivatives market, Bank Negara Malaysia (BNM) has introduced the Islamic Financial Services Act 2013 (IFSA2013) (BNM, 2013a) and Investment Account 2014 (IA2014) (BNM, 2014). In addition, BNM issued wa`d (promise) document that emphasises the purpose of derivatives and embedded derivatives for risk mitigation or hedging.

In Islamic derivative market, Islamic foreign exchange option applies the principles of murabahah and wa`d which differentiates the price of Islamic foreign exchange option from conventional market. Murabahah refers to sale and purchase of an asset where acquisition cost and mark-up profit are disclosed to the purchaser. It is a sale and purchase contract which is binding in nature. Thus, the contract shall not be terminated unilaterally by any of the contracting parties (BNM, 2013b). However, Wa`d is the unilateral promise which refers to an expression of commitment given by one party to another to perform certain actions in the future (BNM, 2017). In relation to that, the Securities Commission of Malaysia has come out with a revised guideline for the Islamic derivatives. The guidelines on unlisted capital market products under the lodge and launch framework (Securities Commissions 2017; 2020). This guideline requires all of the derivatives products both existing and new to obtain approval from Shariah Advisory Council of Securities Commission, Malaysia in order for those products to be available for public. The resolution by Shariah Advisory Council, Securities Commission Malaysia (2006), stated that both Islamic foreign exchange option and option premium are permissible due to the rights of an option that are treated as mal (property). This is an utmost important ruling by the authorities to govern the derivatives market.

Theoretically, Islamic foreign exchange option is seen as similar to the concept of urbun (earnest money). Both share the same characteristic in managing the risk of an underlying asset. The permissibility of urbun in the Islamic derivative market provides an alternative of hedging instruments. Urbun is defined as a sale transaction in which the buyer deposits earnest money with the seller as part payment of the price in advance but agrees that if he fails to ratify the contract, he will forfeit the deposit money, which the seller can keep. However, urbun and option can be differentiated either by the right to buy or the right to sell. Urbun is not allowed to be traded although it is a financial right, while Option is allowed to be traded due to its definition of mal (property). In addition, urbun considers the price paid upfront as part of the purchase price, unlike option (Bacha, 2005). If a buyer wishes to buy, the portion that has been paid upfront is considered as the part of the purchase price. But if the buyer wishes not to buy, the portion that has been paid upfront is forfeited. Hence, the Islamic foreign exchange option is structured based on Shariah principles, concepts and contracts for it to be valid with the objective to hedge against the risk of fluctuations in foreign exchange or currency market (Dusuki, 2009).

The Islamic foreign exchange option as Shariah compliant instrument is made available especially to Muslim's businesses who are in need to hedge their foreign exchange position and safeguard against losses in their foreign exchange translation. Nevertheless, there is a huge call for Islamic derivatives not only to provide solution for multifaceted business in Islamic finance; it is also serving as protection of wealth in line with the spirit of wealth preservation in the maqasid al-shariah (Objective of shariah). In addition, in the case of Malaysia, conventional and Islamic banks are co-exist. With a dual banking system represented by 16 Islamic and 27 conventional commercial banking institutions that are able to arrange and offer products with attractive and innovative features at competitive prices. From the Islamic point of view, premium of an option is recognized as profit based on the commodity murabahah contract. This is due to the true meaning of murabahah where the profit is disclosed upfront before concluding the contract. For murabahah arrangement, profit from the contract is equivalent to option premium earned in a conventional market (Dusuki, 2009). Therefore, pricing for Islamic foreign exchange option is derived from transaction of commodity murabahah at a trading platform such as Bursa Suq Al-Sila a multi-currency commodity trading platform.

Technically, pricing for the Islamic foreign exchange option is derived from transaction of commodity murabahah. Still, the conventional market does give some impact to the price of the Islamic foreign exchange option, to some extent. In fact, it is evident that in market practice the issuing banks formulate a competitive price against Option pricing formulation using the Black and Scholes model (BSM). Subsequently, price of Islamic foreign exchange option is being reflected through commodity murabahah trading. Given the above setting and a dual banking system in Malaysia, how does Islamic foreign exchange price is independently determined by the commodity murabahah trading? What are other factors affecting Islamic foreign exchange price in dual banking system? Empirical studies on the factors affecting the Islamic foreign exchange option price in a dual banking system i.e Malaysia have not sufficiently explored. The study aims to gauge how commodity murabahah trading affecting Islamic foreign exchange option price in the derivative market in Malaysia. This study also seeks determine the long run and short run relationship between commodity murabahah trading and spot rate, strike rate, volatility and interest rate and the Islamic foreign exchange option price, also known as the option premium which is the cost of getting the option. This study frames the discussion from the investor's point of view as the transacting party with the Islamic bank. As such, investors and clients are used interchangeably in this study. The remainder of the paper is organized as

follows: Section 2 presents the literature review. Section 3 elaborates the research design and methodology. Section 4 discusses the findings. The final section provides the conclusions.

LITERATURE REVIEW

In general, risk is a measure of uncertain events to take place in the future. Financial literature describes risk as the amount of potential loss from a financial transaction when a possible outcome is unknown. In the context of Islamic derivative, risks involved in financial transactions are referred as gharar (uncertainty) and maysir (gambling) (Dusuki, 2009). However, prohibition of gharar and maysir are applied to unjust consumption of assets without element of risk but consuming none of risk elements to gain certain profit is not permissible. Financial risk is recognized in gaining profit as in expression of legal maxims "Al-ghunm bil-ghurm" which means "entitlement to profit is accompanied by responsibility for attendant expenses and possible loss". Nonetheless, it does not quantify specifically on the amount of risks to be taken for any financial transaction. Thus, managing those risks is equally important in Islamic derivative to ensure there is no excess of risks are taken as it replicates maysir, which is prohibited.

Scholars Opinions on Derivative Instruments

Literature in financial derivative define hedging as an effort to manage risks and offset potential losses or gains. The concept of hedging is widely used in conventional and Islamic derivative market. Resolution No.2:28 at the Barakah Symposium, Jeddah 2007 (Al-Barakah Banking Group, 2007) on Islamic principles for risk management has outlined as follows:

i. In Islamic financial activities, the pre-condition is that investors bear the risks. This is based on the principle of "al-ghunmu bi al-ghurmi" which means that entitlement to profit is accompanied by responsibility for attendant expenses and possible loss. This is in agreement with the hadith: "Inna al-Kharaj Bi al-Dhaman" which means the entitlement of profit from something is dependent on responsibility for attendant expenses and possible loss and defects (Al Tirmizi, Abu Dawud, Ibn Majah and Ahmad). Consequently, any investment activities based on the separation between "al-ghunm" (profit) and "al-ghurm" (loss), where investors are qualified to receive profits without bearing "daman" (responsibility for losses or risks), are not allowed. Any contracts or contractual terms which are meant to guarantee investment capital and profit are contradictory to Shariah.
ii. Mitigating risk through hedging is allowed if managed in line with Shariah mechanisms, contracts and instruments, and they do not contravene Shariah principles (Resolution No.2:28) (Al-Barakah Banking Group, 2007).

According to Dusuki (2009), derivatives are risk management instruments with restricted objective for hedging purpose. Derivatives are normally used either by banks or corporations and companies to reduce the risk associated with the changes in price of an underlying asset (Nordin et al., 2014; Rizvi et al., 2014). Therefore, derivatives act as a hedging tool with the objective to manage and to minimize risk in any business activities. It is seen as an opportunity for both banks and companies to minimize their underlying asset price risks, without having to fear about

price movements of the underlying asset in the market (Dusuki, 2009). One of the derivative contracts used for hedging is the option contract.

Option is one of derivative instruments for hedging purpose in managing risk. An option is a contract whereby an option holder pays a certain amount of money as the price of getting an option premium. An option holder has the right but not obligation to buy or sell the underlying asset at an agreed up-on price, which is known as the strike rate for a specific tenure. It would give a protection against future adverse price movement up to the amount of premium paid to the seller of an option (Chance 2008). Conventional option is obviously rejected in Islamic finance by majority of scholars (Arbouna, 2006) due to its excessive speculative tendencies (Nordin et al., 2014). Though, it has been a debate on whether option and option premium are aligned with the rulings of Shariah. The issue is about the right of an option if it is considered as mal (property) from Shariah point of view. Muslim scholars have different opinions pertaining to this issue. Nevertheless, majority of scholars have expressed their opinion that an option fulfils the concept of mal in Shariah as it has value for a certain period of time. This is based on Al-Amine (2008), which mentioned that the right of an option is recognized as a property, therefore, it can be a valid subject matter of a contract in Shariah, which is also known as haq maliy (rights of financial assets). Another argument that can support the usage of an option in Islamic finance is the structure of an option itself that is compliant with Shariah rulings (Dusuki, 2009). Derivative in conventional banking is closely associated with trading, arbitrage and speculative purposes. This perception, in a way has contributed to determent of derivative development in Islamic finance. In fact, Islamic derivative is arguable due to different interpretation of school of thoughts (Omar, 2011). Due to the dissimilarities in opinion of the scholars towards Shariah permissibility of derivative instruments, the development of Islamic derivatives market has been limited.

In the context of Malaysian derivative market, the Shariah Advisory Council of Securities Commission Malaysia resolution has granted the usage of call warrants on a basis of conformity to Shariah principles (Securities Commission Malaysia, 2003). The approval for using call warrants is based on the fact that it has the features of mal according to haq maliy (right on financial asset) and haq tamalluk (right of ownership). According to Qudamah (1972), rights are divided into two types. First, haq maliy that refers to the rights on assets with financial values, such as haq dayn (debt rights) and haq tamalluk. The second type of rights is haq ghair maliy which relates to the rights that are not related to assets with financial values, for instance, haq hadhanah (child custody rights) and haq wali (right to be a guardian) (Al-Amine, 2008). With that, haq maliy is allowed to be traded as long as it complies with Shariah rules and also it must fulfils the conditions of buying and selling. The approval of buying and selling as required by Shariah has to be met, suggests that option can be traded. The decision of this ruling is based on opinions of past Islamic jurists especially on the definition of rights and benefits (Dusuki, 2009). According to Hanafi school of thought, rights and benefits are not considered as mal. However, based on other mazhabs such as Maliki, Shafie and Hanbali, rights and benefits are regarded as mal (Al-Khafif, 1990). Hence, consideration of mal, both rights and benefits have some kind of value like a property and therefore, it can be traded. In this context, mal refers to usufruct or something that could be controlled and benefitted. Therefore, the premium paid for buying the call option is permissible based on the definition of mal as prescribed in the Resolutions of Securities Commission Shariah Advisory Council Malaysia (Securities Commission Malaysia, 2006).

THEORETICAL CONSIDERATION

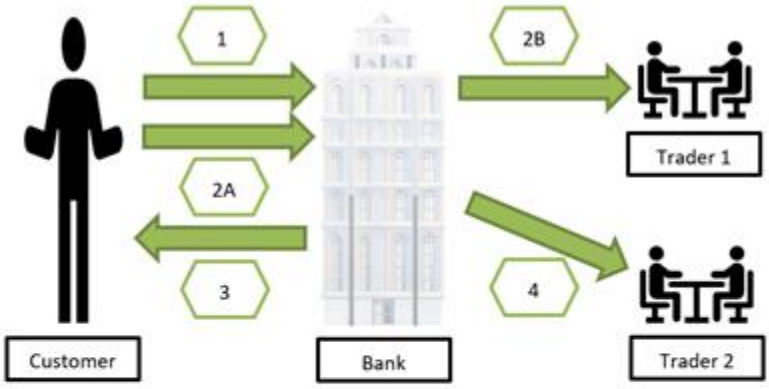
The research framework of this study is built in the foreign exchange option theory perspective, on how the option is valued in a market. The foreign exchange option theory postulates that the premium of an option will determine the price of an option, therefore an investor is made known of the cost of buying an option. The fundamental of option theory is to calculate the probability that an option to expire in-the-money (Black & Scholes, 1973). Black and Scholes model (BSM) was established in 1973 and used to determine the premium of an option specifically for the European option (Eskind, 2010) with the assumption that the risk of the underlying asset is at par or risk neutral (Akgun, 2011). It is a model of price variation over time of financial instruments of the underlying assets like foreign exchange (currency), stocks and commodity.

A strand of studies has been done to analyse pricing factors for the option using Black and Scholes pricing mechanism. In general, BSM assumed that financial market is an equilibrium system where no exogenous influences. Any distortion in the market is temporary and manage by market players to restore at equilibrium state. Hence, an option's price or a value of an option is obtained at a state equilibrium. Generally, it is expected that a positive relationship between spot price, strike price, volatility, tenure and risk neutral interest rate and price of call option. However, a study by Kotze (2011) found that if spot price of underlying stock and risk neutral interest rate fall, then the option price falls too. Hence, volatility, risk neutral interest rate and time to expiration have a positive relationship towards the price of an option. But spot price and strike price have a negative relationship against the option price. If spot price goes higher, it reduces the put option price and makes the call option price higher. A reverse effect for a strike price reduces a call option price and increases a put option price. Eskind (2010) discussed on implied volatility ability to predict future realized volatility by using BSM. The result showed that implied volatility varies in forecasting future realized volatility and it is very much depending on the selected currency pair. A different currency pair generates different future volatility.

Similarly, Canina and Figlewski (1993) conducted a study on Standard and Poors' 100 indexes and found out that implied volatility has minimal impact in forecasting future realized volatility. However, result from a similar context done by Christensen and Prabhala (1998) showed that in Standard and Poors' 100 index options, implied volatility has an ability to forecast future realized volatility. The study was based on longer data set with no over-lapping data that gave a different finding as compared to the result obtained by Canina and Figlewski (1993). Nonetheless, Castagna (2005) analysed the relationship between implied volatility and realized volatility in making a profitable option trading. It was found out that profit can be made if realized volatility is higher than implied volatility. Generally, if the option is bought and hedged at an implied volatility lower than realized volatility, then profit can be made over the life of an option. Once the implied volatility goes higher than realized volatility, then loss is expected from the option trading. In summary, BSM is the most established option model for formulation of price. Empirically, spot rate, strike rate, volatility and macroeconomic factors were found to affect the foreign exchange option price.

Islamic Foreign Exchange Option and Commodity Murabahah

For Islamic derivative instrument, a structure of Islamic foreign exchange option makes use contract of murabahah and principle of unilateral promises (wa`d). Murabahah is a contract of exchange, defined as selling a commodity for its purchase price plus a specified mark-up profit agreed upon. The conditions of any Murabahah contract, original cost and profit must be disclosed, price must be determined and agreed by both seller and purchaser, contract must be legitimate according to Shariah, asset of sale must be lawful and an object of value, payment may be in spot, deferred, in lump sum or instalment basis (BNM, Murabahah policy document, 2013). Whilst Wa`d is a unilateral promise which refers to an expression of commitment given by one party to another to perform certain actions in the future. Wa`d is not a contract and wa`d is attached to a condition, time, price, conduct or event shall be binding on the promisor. A forward currency exchange transaction may be arranged based on wa`d. The arrangement of wa`d in a transaction involving currency exchange is permissible provided that it is structured for the purpose of hedging. The parties involved in wa`d are the promisor (wa`d) and the promisee (maw`ud lahu). The promisor shall be a natural person or a legal entity that must have the legal capacity to execute the subject matter of wa`d (BNM, Wa`d policy document, 2017).



Step	Description
1	Customer buys the foreign exchange option price from the Islamic bank.
2A	Customer signs the necessary legal documentation with the bank and agency agreements; i.e to appoint the bank to purchase the commodity *murabaha* on behalf of the customer.
2B	Bank purchases the commodity *murabaha* from trader 1 at the purchase price.
3	Bank sells the commodity *murabaha* to the customer at the selling price, which shall be payable by the customer to the bank on spot date (T+2).
4	Customer appoints the bank (acting as an agent) to sell the commodity *murabaha* to trader 2 at the purchase price.

FIGURE 1
DETERMINATION OF PRICE OF THE ISLAMIC FOREIGN EXCHANGE OPTION VIA COMMODITY MURABAHAH TRADING.

Figure 1 illustrates flow of price origination for the foreign exchange option. In summary, profit is disclosed upfront before concluding a murabahah contract arrangement. Accordingly, premium of an option is recognized as a profit based on the commodity murabahah contract. It is equivalent to option premium earned in a conventional market. The profit is derived from transaction of commodity murabahah at a trading platform such as Bursa Suq al-Sila a multi-currency commodity trading platform. Hence, arrangement of commodity murabahah and wa`d

is used to structure the Islamic foreign exchange option. The option premium originates from commodity murabahah trading, while wa`d applies on the currency exchange for the hedging purpose.

METHODOLOGY AND DATA

Measurements of Variables

The following empirical model is postulated to describe the relationship among the variables for purpose of estimation as proposed by Kotze (2011) and Akgun (2011). The dependent variable is Islamic foreign exchange option price, a profit arising from the Commodity murabahah transactions. The independent variables are; first, Spot rate refers to the exchange rate of a particular currency pair that is determined as the underlying asset at the time of the trade. It refers to the price of currency exchange that can be sold or bought. It is also used as the reference price for the investor to gauge on the strike rate (Hull, 2005). This study uses Spot rate of USD/MYR due to the highest volume currency pair in the derivative market. Second, Strike rate of USD/MYR is the rate at which the underlying asset will be converted for the particular currency pair if the option is exercised. Strike rate is normally known from the knowledge of the current underlying asset, which is the spot rate. Strike rate also represents the cost to the investor. This is the price that the investor is willing to convert their holding currency into another currency at par when there is no loss incurred for that particular trade (Kotze, 2011). Third, option volatility measures the magnitude of changes in the price of the underlying asset. It is a statistical measurement of the degree of fluctuation for the particular underlying asset (Kotze, 2011). Fourth, the interest rate refers to the one-week money market deposit rate. The applicable of the interest rate is depending on the tenure of the option itself. For the purpose of pricing the Islamic foreign exchange option price, the assumption is made that the investors require no compensation for risk i.e. risk free (Al-Jallad 2018). The expected return on all securities is thus the risk-free interest rate with the consequence that there are no arbitrage opportunities. This was one of Black and Scholes's insights and is known as risk-neutral valuation (Kotze, 2011). Finally, crude palm oil (CPO) trading volume refers to the weekly volume of commodity traded in the Bursa Suq al-Sila'. Bursa Suq al-Sila' is the exchange or a place where the Shariah compliant commodities are being traded to accommodate the Commodity murabahah transactions (Bursa Malaysia, n.d.). Crude palm oil trading volume is selected due to the fact that it is the most traded commodity for murabahah transactions by the Islamic interbank counterparties. Therefore, crude palm oil trading volume is related to the price of the Islamic foreign exchange option price that is used to derive the profit of murabahah which is equivalent to the option premium (Nicolin, 2015).

Empirical Model and Data

This study employed the Autoregressive Distributed Lag (ARDL) approach to co-integration (Pesaran et al., 1999; Pesaran et al., 2001). The ARDL approach performs better for determining co-integrating relationships in small samples (Romilly et al., 2001). It also maintains the additional advantage that it can be applied irrespective of the regressors' order of integration, I (0) or I (1), thus allowing for statistical inferences on long-run estimates, which are not possible under alternative co-integration techniques. To establish long run relation among the variables ARDL bounds testing has been employed. The ARDL approach to cointegration

(Pesaran et al., 2001) involves estimating the conditional error correction of the ARDL model for Islamic foreign exchange option price and its determinants an in equation (1).

$$In(\mathrm{Pr}ice)t = \alpha 1 + \sum_{i=1}^{p} \phi 1iIn(\mathrm{Pr}ice)t - i + \sum_{i=0}^{p} \beta 1iIn(Spot)t - i + \sum_{i=0}^{\phi} \theta 1iIn(Strike)t - i +$$

$$\sum_{i=0}^{p} \lambda 1iIn(Volatility)t - i + \sum_{t=0}^{p} \lambda 1iIn(Interest)t - i + \sum_{t=0}^{p} \lambda 1iIn(CPO)t - i + \mu t$$

The F test is used for testing the existence of long-run relationship. When long-run relationship exists, F test indicates which variable should be normalized. The null hypothesis for no co-integration among variables in equation (1) is H_0: $\delta_1 = \delta_2 = \delta_3 = \delta_4 = 0$ against the alternative hypothesis H_1: $\delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq 0$. The F-test has a non-standard distribution which depends on (i) whether variables included in the model are I (0) or I (1), (ii) the number of regressors and (iii) whether the model contains an intercept and/or a trend. The test involves asymptotic critical value bounds, depending whether the variables are I (0) or I (1) or a mixture of both. Two sets of critical values are generated which one set refers to the I(1) series and the other for the I (0) series. Critical values for the I(1) series are referred to as upper bound critical values, while the critical values for I (0) series are referred to as the lower bound critical values.

If the F test statistic exceeds their respective upper critical values, it can be concluded that there is evidence of a long-run relationship between the variables regardless of the order of integration of the variables. If the test statistic is below the upper critical value, the null hypothesis of no co-integration cannot be rejected and if it lies between the bounds, a conclusive inference cannot be made without knowing the order of integration of the underlying regressors. If there is evidence of long-run relationship (co-integration) of the variables, the following long-run model is estimated. The orders of the lags in the ARDL model are selected by the Schwarz Criterion (SC). The ARDL specification of the short-run dynamics can be derived by constructing an error correction model (ECM) based on the following equations. All coefficients of short-run equation are coefficients relating to the short run dynamics of the model's convergence to equilibrium and ψ represent the speed of adjustment.

Goodness of fit of the ARDL model, diagnostic and stability test are conducted to assess multivariate issues associated with the model. The stability test is conducted using the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMsq).

The study made use of weekly data from January 2012 until December 2016 of the Malaysian derivatives market. The data set was obtained from the Bloomberg Terminal database and the annual report of Bursa Suq al-Sila'. A weekly basis data set was based on the most demanded tenure in the Islamic foreign exchange option market and the currency pair for USD/MYR was also the most used currency for the international trade transactions. Meanwhile, data for weekly crude palm oil trading volume traded was obtained from the annual reports of Bursa Suq Al-Sila'.

RESULT AND DISCUSSION

Table 1 presents the descriptive statistic of the data set. All the variables are in Natural logarithm. The p-values of the Jarque-Bera show that three series of variables, price, volatility and crude palm oil trading volume non rejection of the null hypothesis of normal distribution at

5% level of significance. Meanwhile, series variables of strike, spot and interest suggested rejection of the hypothesis of normal distribution at the 5% significance level.

Tabel 1
DESCRIPTIVE STATISTICS

	PRICE	SPOT	STRIKE	VOLATILITY	INTEREST	CPO
Mean	7.7767	1.2475	1.2526	2.0332	1.1239	22.1986
Maximum	8.4741	1.4994	1.5038	2.7145	1.2014	23.6475
Minimum	7.1369	1.0860	1.0909	1.4187	1.0577	20.3493
Std. Dev.	0.2901	0.1265	0.1273	0.2766	0.0512	0.6751
Jarque-Bera	3.9252	30.765	30.8313	3.4051	36.558	4.9754
[p-value]	[0.1404]	[0.0000]	[0.0000]	[0.1822]	[0.0000]	[0.0830]
Note: *p < .01, p < .05, p < .10.						

Prior to employing the ARDL co-integration approach, it is useful to test the order of integration of each series by applying the Ng-Perron (2001) procedure. The study uses the Augmented Dickey Fuller (ADF) test and Phillips Perron (PP) test with trend. The null hypothesis states all variables have a unit root or non-stationary. If the null hypothesis is rejected, the series is stationary and has a unit root. Based on the ADF test, the results depicted that most of the variables were non-stationary at level I[0] but stationary at first difference I[1]. The natural logarithm of volatility and crude palm oil trading volume were stationary at level I[0] but with significant levels of 1% and 10%, respectively. For consistency, the study used the Phillips-Perron test to test the stationarity for all variables. The results in Table 2 showed a consistency of stationarity for all variables used in the model, except for the natural logarithm of price which was stationary at level difference [0] using Phillips Perron (PP) test with trend. In conclusion, some series were stationary at level I[0], some at I[1] fractionally integrated. Pesaran and Shin (1998) suggested that the ARDL bound model can be used for all the cases as long as none of the series is beyond I[0], or at 2nd difference I[2]\

Table 2
UNIT ROOT TEST (T-STATISTIC)

Variables	Level		First Difference		Order of Integration
	ADF	PP	ADF	PP	
Price	-2.962	-3.528**	-19.592*	-21.41*	I(1)
Spot	-2.113	-2.274	-14.891*	-14.92*	I (1)
Strike	-2.147	-2.291	-14.942*	-14.961*	I(1)
Volatility	-3.582**	-3.412*	-18.554*	-19.623*	I(0)
Interest	-2.563	-2.433	-13.151*	-16.512*	I(1)
CPO	-	-	-	-	I(0)

	12.866***	14.051*			
Note: Symbols of *p < .01, **p < .05, ***p < .10					

Table 3 presents the statistical results for the Bound test. The study applied the F-Statistics for co-integration test or Bounds test of the model. The study used the Akaike information criterion (AIC) and Schwarz criterion (SIC) as optimal lag selection criteria for the model. The test statistics of the F-statistics was 10.59787 and exceeded the upper critical bounds which confirmed co-integration at the 1% level of significance. The result implied that we can reject the null hypothesis as there was no equilibrating relationship. It can be concluded that there was a long run relationship among the series for the model.

Tabel 3

TABLE 3. STATISTICAL OUTPUT FOR BOUNDS TEST

F-Statistic Value	k	Significance level	Bound Critical Values (unrestricted intercept and no trend)	
			Lower Bound I(0)	Upper Bound I(1)
10.59787	5	10%	2.26	3.35
		5%	2.62	3.79
		1%	3.41	4.68
Note: Symbols of *p<.01, **p<.05, ***p<.10. Critical value bounds are computed by surface response procedure developed by Pesaran et al. (2001).				

ARDL Long-Run Model and Short-Run Model

The results for the long-run and short-run models are presented in Table 4. The result for long run model shows that Spot rate is positively and statistically significant affecting Islamic foreign exchange option price at 1% level of significance. Meanwhile, Strike and Volatility are negative and significantly affecting Islamic foreign exchange option price at 1% level. The values of the coefficients for the Spot and Strike showed approximately similar for the long run and short run models. A possible explanation is perhaps the Spot and Strike give same weightage on variation in the Islamic foreign exchange option price. All other signs of coefficient were consistent with the theory and previous studies such as the Black and Scholes pricing model and studies done by Akgun (2011) and Black and Scholes (1973). They found that spot rate (price of the underlying asset) and volatility were significant towards the price of an option.

Moreover, this study reveals that interest rate and crude palm oil trading volume are insignificant in affecting Islamic foreign exchange option price in the short run and long run. It implies that crude palm oil trading volume is not significant in explaining the variation in the Islamic foreign exchange option. The fact that crude palm oil trading volume is the most traded commodity murabahah transactions by the Islamic interbank counterparties in Malaysian Islamic financial market. The result does not indicate that crude palm oil trading volume as an important element in explaining the variation in Islamic foreign exchange option price in the short run and long run. The finding implies that the Islamic foreign exchange option price does not depend on the crude palm oil trading volume which is required in the trading of commodity murabahah as what is the practice in the derivative market.

Tabel 4
STATISTICAL OUTPUT FOR ARDL LONG RUN AND SHORT RUN MODEL

Long-Run Model		**Short-Run Model**	
Constant	5.7043	Constant	4.6403
	(-0.1147)		(-0.2164)
lnSpot	-28.787***	$\Delta lnSpot_{t-1}$	-69.334*
	(-8.395)		(-6.8788)
lnStrike	28.741***	$\Delta lnStrike_{t-1}$	69.274*
	(-8.389)		(-6.881)
lnVolatility	0.9319***	$\Delta lnVolatility_{t-1}$	0.7581*
	(-0.0365)		(-0.0322)
lnInterest	0.0325	$\Delta lnInterest_{t-1}$	0.0265
	(-0.0586)		(-0.0477)
InCPO	0.0022	$\Delta lnCPO_{t-1}$	0.0018
	(-0.0051)		(-0.033)
R-squared	0.8659	ECT_{-1}	-0.8135*
Adj. R-squared	0.8537		-0.0331
F-statistics	201.83		0.8916
p-value	0		0.8837
			375.84
			0

Note: Symbols of *p<.05, **p<.0,***p<.10. Standard Error are in parentheses

The short run estimates showed that the error correction term (ECT_{t-1}) value was -0.8135. All the signs of the coefficients are consistent with the long run model. The significance of an error correction term (ECT) shows the evidence of causality in at least one direction. The negative and significant speed of adjustment value indicate that shocks in the short run was corrected by 81.35% towards of convergence the long run equilibrium.

In conclusion, the price of Islamic foreign exchange emulates by the broad and competitive market practices, in particular in a setting of dual banking system. The constraints on availability of efficient mechanism in the line of business needs (Anwer et al., 2019). The crude palm oil trading volume as the most traded commodity murabahah was unimportant as an essential component in explaining the variation of Islamic foreign exchange option price in the short run and long run.

Table 5
STATISTICAL OUTPUT FOR DIAGNOSTIC TEST

	F-Statistic (p-value)	**Jarque-Bera (p-value)**
Serial Correlation Lagrange Multiplier (LM)	1.0427 (0.3396)	
Normality Test		1.9264 (0.3817)

Note: Symbols of *p<.01, **p<.05, ***p<.10. P-values are in parentheses.

The models passed the diagnostic tests of serial correlation and normality as indicated in Table 5. The serial correlation LM test showed an insignificant p-value at the 5 percent significance level and it failed to reject the null hypothesis. The normality of error term in the series of residual was showed insignificant at the 5 percent significance level. The error terms in the series of residual were normally distributed

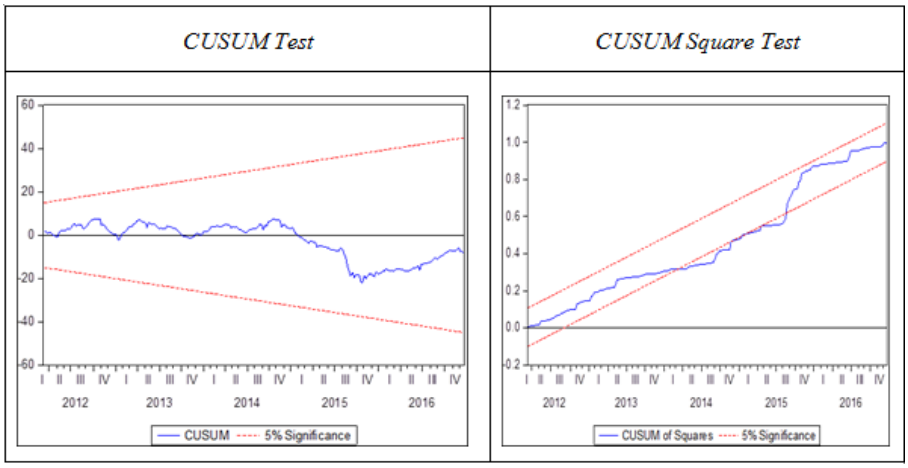


FIGURE 2
Statistical Output For Cusum Test And Cusum Square Test

The stability of the long run parameters was checked using the CUSUM test. The findings confirmed the stability of the long run parameters. The plots of the residuals were in between the 5 percent critical bounds for the model. Even though, there was a slight deviation of CUSUM squared test between the year 2014 until third quarter of 2015. There was no structural break after further test was conducted using the Chow test as suggested by Islam et al., (2013).

CONCLUSION

This study examined the influence of the commodity murabahah transactions on the Islamic foreign exchange price in the short run and long run. The study utilized weekly data from January 2012 until December 2016 of the Malaysian derivatives market. The data set was obtained from the Bloomberg Terminal database and the annual report of Bursa Suq al-Sila'. The study found that the Spot rate is positively and statistically significant affecting Islamic foreign exchange option price. Whilst Strike and Volatility were negative and significantly affecting Islamic foreign exchange option price. In addition, the determination of Islamic foreign exchange price has been dominance by the broad and competitive market practices, in particular in a setting of dual banking system. Though, the current practice by the Islamic banks in using Black and Scholes pricing model to obtain the competitive Islamic foreign exchange option price is seen as the best technical alternative, commodity murabahah transactions (ie. Crude palm oil

trading volume) has not indicated to establish link with variation of Islamic foreign exchange option price.

The main challenge that impedes the development and operation of the Islamic foreign exchange contract as a hedging instrument, is reliance on the existing conventional framework with a core conception based on interest rate and excessive risk taking which are prohibited in Islam. It is a high time for Islamic foreign exchange option price to have its own pricing mechanism that is totally independent from the conventional foreign exchange option pricing model. However, with the dual financial system that is being practiced in the Malaysian derivative market, it seems by leveraging on the conventional way of getting the foreign exchange option price is considered more beneficial than creating the new Islamic pricing option mechanism on its own. Nevertheless, it is possible for the Islamic community around the world to establish a platform that is able to provide a greater foreign exchange option liquidity in order to price the Islamic foreign exchange option. In the edge of digitalized era nowadays and utmost unity among the Muslim countries, Islamic option pricing model that probably going to happen in the near future. Finally, the propositions developed in this study have some limitations. The availability of information for crude palm oil trading volume was limited. Most of the previous studies done were merely theoretical and conceptual basis rather than collecting empirical evidence from the market.

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