GHARAR IN FUTURES CONTRACTS FROM ISLAMIC PERSPECTIVE: A CASE STUDY OF USA & MALAYSIA

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Abstract

This paper investigates whether the financial futures contracts are acceptable from Shariah perspective by examining one of the futures prohibition elements that make them unaccepted as Islamic instruments, which is Gharar (volatility of prices) in both developed countries (USA) and in emerging countries (Malaysia). This paper studied if the introduction of futures resulted in increasing the volatility of the market; and if there is a real difference between the stock index and futures' volatility in both countries, as a sign of Gharar existence. Also, the study compared between the volatility of futures and Shariah indices to examine if their volatility differs or they are the same as Shariah indices were introduced to meet the increasing demand for Islamic investment and to fulfil Shariah rules and regulations. Four volatility measures were used (open to open prices, close to close prices, Parkinson extreme value estimator and Garman Klass Volatility (GKV)). The reported results in both countries indicated that the introduction of futures indices had a meaningful and significant impact on the volatility of stock markets to be higher for the selected period. Also, the daily volatility for both stock and futures markets is significantly different during the study period and the futures volatility was higher. In addition, the daily volatility for both Shariah and futures markets is not significantly different during the study period. Reported results support the opponents of futures, who stated that futures make the markets unstable and destabilize, by increasing risks in the markets through increase prices' volatility. Thus, futures indices involve excessive risks (Gharar), which void the contracts, encourage speculation activities, and ending with other prohibited element gambling. Also, it supports that the Shariah indices are not different from Futures, only the name changed by an Islamic one.

Keywords: Futures Contracts, Islamic Finance, Gharar, Case Studies, USA, Malaysia

1. INTRODUCTION

Markets are characterized by rapid changes and increased risks, which require tools for managing and hedging these risks (Al-Saati, 2002; Al-Suwailem, 2006; Kunhibava, 2010; Jobst & Solé, 2012; Al-Taani, 2013; Ehsan, 2013; Azlin & Mustafa, 2014). One of the most well-known and internationally recognized tools of hedging against risks is futures instruments. Simultaneously, the Islamic financial sector is growing rapidly. The need to use risk management tools is essential to maintaining its growth and sustainability. Yet, accepting futures instruments remains questionable from an Islamic point of view.

The general view stated and considered futures instruments violate Shariah and are unaccepted. They involve Riba[1], Gharar, and gambling. In the

[1] Riba is the exceeding amount over what has been lent, whether it is small or large.

same time, there are different Islamic tools, which can be used instead, such as Salam[2] and Istisna[3] (Islamic Fiqh Academy & Development Bank, 2012; Khan, 1988; Usmani, 1996, 2010; Khan, 1997; Obaidullah, 1998a, 1998b, 1999; Radhwan, 2005; Al-Zuhali, 2006; Ayyash, 2008; Danila & Jeffers, 2009; Jobst & Solé, 2012; Rizvi & Lahsasna, 2012; Abozaid, 2014; Injadat, 2014; Hourani & Zarai, 2014; Uddin, 2015; Nadhirah et al., 2015; Nadhirah et al., 2017). And the others who saw futures instruments compatible with Shariah, since the main objectives of Shariah are hedging and protecting property (Kamali, 1995, 1999, 2005, 2007; Bacha, 1999, 2004; Al-Amine, 2008; Al-Taani, 2013; Ehsan, 2013).

Gharar is one of the factors used to prohibit futures. The most prominent jurists defined Gharar as the uncertainty of prices (fluctuation in prices), which is similar to the definition of volatility. This leads to raising the uncertainty that makes the contract invalid in Shariah (Anwar, 1995; Obaidullah, 1999, 2001; Al-Saati, 2003; Tag El-Din & Hassan, 2007; Nadhirah et al., 2014; Mihajat, 2016; Nehad & Khanfar, 2016). When examining the effect of the introduction of futures on the stock markets' volatility, it will reflect the presence of Gharar in these markets. Until now, there is a debate whether the introduction and trade of futures contracts have resulted in destabilization of the underlying stock markets. Consequently, it leads to stabilize market either through reduction or at least no change in its volatility.

Islamic indices were introduced as an alternative to stock and futures, conforming the rules and principles of Shariah. However, many researchers believe that they are similar to conventional (they are not completely satisfying Shariah laws), but it is a means of circumventing the Shariah (Khan, 1997; Abozaid, 2014; Nadhirah et al., 2015). When examining the volatility of Shariah indices comparing to futures ones, it will indicate if they are significantly different or both involve Gharar, which is forbidden in Shariah.

This paper investigated the USA and Malaysian futures financial markets indices to show the consequences of the introduction of futures derivatives on the stability and volatility of the market as a sign of Gharar. The USA was chosen to represent developed countries. The USA is the leading country in introducing and creating different derivatives instruments and indices. The first futures contract index in the world was introduced by the Kansas City Board (The Value line contract), which was launched to trade at 24 February 1982 in the USA. It was followed by S&P 500 index which was launched at 21 April 1982, S&P 500 index was selected, as it is more popular and one of the most universally followed indices. It is the greatest index to represent the USA stock market. The USA was leading in the introduction of Shariah index as the Dow Jones Islamic Market Index was introduced in 1999. It was followed by S&P, which started offering a number of Shariah indices in 2006, as the S&P 500 Shariah Index, the S&P Europe 350 Shariah Index, and the S&P Japan 500 Shariah Index. To be consistent, the S&P 500 Shariah index was selected to compare between the volatility of future index and Shariah, which was introduced at 19 December 2006.

Malaysia was chosen to represent emerging countries. Malaysia is one of the leading emerging countries in Asia in which financial derivatives was introduced. The trading of the Kuala Lumpur Composite Index Futures contract (KCIF) was made through the Kuala Lumpur Options and Financial Futures exchange (KLOFFE) at 15 of December 1995. In 1998, the Shariah Advisory Council of the Securities Commission of Malaysia (SAC) permitted the use of derivatives based on hedging purpose. It generates benefits (Maslahah) for both investors and the economy. It allows future contracts on definite commodities such as crude palm oil and permitted Bai Urban. Besides, it accepted stock index futures contracts seeing that its mechanism does not violate Shariah principles. KLCI index was selected and its corresponding futures. To be consistent, Kuala Lumpur Shariah index (KLSI) was selected to compare between the volatility of future index and Shariah, which was introduced on the first of January 2000.

Despite a number of studies has examined the effect of trading futures index on the stock market but no one measure volatility of the introduction of futures and comparison between the volatility of futures, stocks, and Shariah indices as a sign of the existence of Gharar to determine whether they are accepted from an Islamic perspective. Therefore, it is vital to examine various issues concerning the introduction of future in both developed and emerging countries. This study examines the following research issues:

1. Does the introduction of future index lead to significant change in the volatility of the underlying stock market?
2. Are the differences between volatility in the future index and stock market significant?
3. Are the differences between volatility in future index and Shariah index significant?

The paper is arranged as follows: section 2 gives an overview of important studies related to the above three issues. Section 3 describes the data and methodology used. Section 4 shows the results and analysis. The final section, section 5 provides a summary and conclusion.

2. LITERATURE REVIEW

In this section, an overview of some major studies related to the impact of the introduction of futures on the spot markets and comparison between spot and futures markets' volatility will be discussed.

2.1. Impact of trading of futures on the volatility of stock market

There are different points of view in the literature regarding the introduction and trading of futures. One of the views argues that introduction and trading of futures lead to destabilizing underlying stock market through increasing its volatility. Increase volatility due to a higher degree of leverage causes the movement of more investors who do not have perfect information to future market (Hellwig, 1980), it also attracts uninformed speculative investors due to lower transaction cost (Cox, 1976; Figlewski, 1981).

[2] Salam is a contract in which price of assets is determined in advance and fully paid in cash in spot to be delivered on a definite future date.
[3] Istisna is a contract used to finance objects that will be manufacture based on order to be to delivered at certain time in the future at predetermine price.

Lockwood and Linn (1990) investigated the Dow Jones Industrial Average (DJIA) volatility after the introduction of Line Composite index (VLCI) using daily intraday open and close returns as a measure of volatility from 1964 till 1989 and concluded that DJIA becomes more volatile following the introduction of VLCI futures contracts in 1982.

Antoniou and Holmes (1995) examined the impact of trading FTSE-100 Stock Index Futures in London, using GARCH model from November 1980 till October 1991. The conclusion was the increase of underlying spot market's volatility due to the trading of FTSE-100. The same results were concluded by Stein (1987), and Kamara et al. (1992).

According to the study made by Bae et al. (2004), the trading of KOSPI 200 futures index in the Korean markets on the volatility and efficiency of both KOSPI 200 and non KOSPI 200 stock index. The data were gathered from January 1990 till December 1998. The study outcomes indicate that the volatility of the stock market was higher and efficiency was better as a consequence of the introduction of futures.

Koustubh and Ajaya (2011) examined the consequences of futures' introduction on the volatility of India stock index. The study used GARCH techniques from January 1998 until December 2009 and use the daily return of fifteen stocks. The study outcomes show that eight of the stocks pattern volatility has been changed to be higher and has strong persistence as a result of the introduction of futures.

Bei et al. (2014) examined the consequences of futures introduction Sp500 on the volatility of the stock index. The study used a new model (EGARCH techniques, non-normal model, and 3factor models). The daily return data was collected from January 1951 until December 2007 and use the daily return of fifteen stocks. The study outcomes show that the volatility of the stock has been changed to be higher.

Another view of this topic argues that there isn't any incremental effect of introducing derivatives in the market stability. Edwards (1988a, 1988b) investigated the consequences of introduction and trading of futures index on the stock market. The study used daily and intraday data from 1972 to 1987 for S&P 500 and the Value Line Composite index (VLCI). The conclusion is that the introduction and trading of future contracts had no effect or increase in the volatility of the stock market. The same results were concluded by Pericli and Koutmas (1997).

Ibrahim et al. (1999) examined the result of introducing future stock index contracts in Malaysia. Using the daily prices (open, close, low, and high) as a measure of price volatility from January 1994 to December 1997 used. Their conclusion was there isn't any proof of volatility increase in the underlying market. However, the daily volatility in the future market is greater than the daily volatility on the underlying stock market. The same results were reached by Darrat and Rahman (1995) and Hogson and Nicholls (1991).

A recent study made by Xie and Huang (2014) examined the impact of futures trading CSI 300 index futures on the volatility of China stock index (CSI 300). The study used GARCH techniques from 2005 until 2012 and used daily return. The study outcomes show no effects on the stock market as the volatility has not changed. The same results were obtained by Yao (2016).

Meanwhile, the other views argue that it stabilizes the market and leads to a decrease in volatility through enhancing the depth and flow of information in the overall market. It leads to a reduction in the cost of responding to mispricing by informed traders. It also has a significant effect on the market's efficiency (Danthine, 1978; Chiraz, 2016), price discovery, and risk transfer (Stein, 1987; Schwartz & Laatsch, 1991; Miao et al., 2017). Thenmozhi (2002) examined the results of introducing the NSE 50 index future in India. Daily closing price was used from 15 of June 1998 till 26 of July 2002 and for the future index from 15 of June 2000 to 25 of July 2002. The results showed that the introduction and trading of future reduced underlying index's volatility in the cash segment. The same conclusion was reached by Gupta (2002), Gahlot et al. (2010), Saravanan et al. (2011) and Alex and Varghese (2015).

Saxena (2012) studied the consequence of the introduction and trading of stock index futures contract on the volatility of India stock index. The study used four volatility measures (close-to-close prices, open-to-open prices, Parkinson's Extreme Value Estimator, and Garman-Klass measure volatility (GKV)). The data collected from June 2007 to June 2010 to both S&P CNX Nifty Index and stock market index. The conclusion of the study showed that the volatility of the underlying stock market has declined in all measures of volatility after the trading of futures. However, there is no evidence that the futures volatility was higher than the stock market. Actually, in some months it was lower than the underlying stock market. The study was consistent with Ibrahim et al. (1999) study.

A recent study by Yilgor and Mebounou (2016) examined the consequence of futures introduction on the volatility and liquidity of the Turkish spot market. The daily closing price and trading volume of BIST-30 were used, from January 2001 till December 2014. The study used the EGARCH and ARMA model. The study outcomes showed that the introduction and trading of futures markets resulted in decreasing the volatility of the spot market.

Other studies concluded mixed results, Lee and Ohk (1992) studied the impact of future contracts introduction and trading in Japan, Australia, Hong Kong, UK and US for two years. The results were different in each country. In Australia, there wasn't any change in the volatility, meanwhile, it decreased in Hong Kong, and increased in Japan. Concerning the USA and UK, the volatility change was mixed.

Another multi-country study was made by Bacha and Villa (1993), which examined the volatility consequences of introduction Nikkei futures in Singapore (SIMEX), Osaka (OSE), and Chicago (CME) with the Tokyo Nikkei Stock Index. Also, it compared between futures and stock indices stock index volatility. The study used the natural logarithm of intraday prices (close to close). The outcomes of the study were different as the volatility increased in Singapore (SIMEX), decreased in Osaka (OSE), and didn't change in Chicago (CME). Concerning comparison between stock and futures volatility; mixed results were achieved as the volatility of the

Nikkei stock index was the same as SIMEX (no difference), and higher than OSE, CME.

Another study was made by Gulen and Mayhew (2000), they studied the effect of introduction and trading of futures trading in twenty-five countries (both developed and less developed). The data period differs from country to country. The starting date differed, but all data collected ended by 31 December 1997. Multivariate GARCH framework was selected to measure volatility. The achieved results were mixed. They found that the volatility in the USA and Japan increased. Meanwhile, in the majority of other countries' markets volatility significantly decreased or stayed approximately the same.

2.2. The volatility of futures contracts comparative to the volatility of stock market

Many researchers have paid attention to the comparison between the spot stock market and futures volatility since starting of futures trading in 1982 in the USA. The results differed. The conclusion of some research showed futures volatility was higher than stock. Other research showed that the futures volatility was lower. Further studies stated no evidence of dissimilarities between them.

Besides the studies mentioned above, Bacha and Villa (1993) research outcomes were mixed as the volatility of Nikkei stock index was the same as SIMEX (no difference), and higher than OSE, CME. Ibrahim et al. (1999) results showed an increase in the volatility of future market over the stock market. Both Gupta (2002) and Saxena (2012) achieved that there wasn't any evidence that the futures volatility was higher than the stock market. Actually, in some months, it was lower than the stock market.

Chu and Bubnys (1990) examined the volatility of stock market indices' price for S&P 500 and the NYSE and their corresponding futures indices. Using three methods to measure volatility which are classical variance, German Klass, and Ball Torous estimator measures. Daily closing prices returns for the S&P 500 and the NYSE were collected for six years period from 1982 to 1988. They concluded that the volatility of the futures market in the two indices were higher than the stock market.

The same results were obtained by the study of Yadav and Pope (1990). They also inspected the relative volatility of the FTSE 100 index in London comparing to futures index. Using three methods to measure volatility, which is daily open-to-open, close-to-close prices and the Parkinson Extreme Value Estimator. The collected data covered six years from 1982 to 1988. They reported that futures volatility was higher.

In another study made by Koutyos and Tucker (1996), it examined the price volatility of stock market indices of S&P 500 in the USA comparing to its corresponding futures index. It used a bivariate error correlation EGARCH Model. Daily closing prices returns for the S&P 500 were collected for approximately ten years, from the first of April 1984 to the end of December 1993. They concluded that the volatility of the futures market and the stock market was persistent.

Patra and Mohapatra (2012) studied the price volatility of futures and stock market indices in the NIFTY index and selected ten blue-chip Sensex stocks in the Indian market. Both ARCH (1) model and standard deviation were used to estimate volatility. The daily closing prices of assets traded and quoted at National Stock Exchange Mumbai from January 2002 till 31 of December 2010. They founded that the futures market was less volatile than the stock market in both underlying indices and 9 out of 10 selected stocks were lower in both volatility methods.

2.3. The Shariah and stock indices performance

The rapid growth of Islamic finance has motivated investors in both Muslim and non-Muslim countries to develop Islamic (Shariah) stock, in which Islamic products and instruments can be traded (Reddy and Fu, 2014). Shariah indices were introduced to satisfy increasing needs to Islamic investment and to be alternative to stock and futures indices. Many researchers nowadays perceive Islamic instruments and indices as a way of Islamize the conventional system. However, it does not completely satisfy Shariah laws (Khan, 1997; Al Ghoul, 2008; Ayoub, 2013; Abozaid, 2014; Nadhirah et al., 2015).

Despite its recognition, few studies have been conducted regarding these indices. Most of the studies compared between stock indices and Islamic indices according to their performance (risk and return). Almost all studies showed that the Shariah index has lower return and risk (volatility) than the conventional index. In this section, an overview of some major studies related to the performance differences between stock and Shariah markets will be discussed.

Ahmad and Ibrahim (2002) examined the performance of (KLSI) Kuala Lumpur Stock Shariah Index and its corresponding conventional system in Malaysia. The day-to-day closing prices for both indices were obtained from April 1999 till January 2002. The outcomes showed that there wasn't any significant difference between the two indices, although KLSI was lower in both overall and decline period.

The study made by Albaity and Ahmad (2008) examined the performance of risk and return of both the Kuala Lumpur Syariah Index (KLSI) and the Kuala Lumpur Composite Index (KLCI). The day-to-day closing price of both KLSI and KLCI were collected. In addition, the risk-free rate was collected from Kuala Lumpur Inter-bank Offer Rate (KLIBOR). The data was gathered from 1999 till 2005. Risk-adjusted return measurements, unit root analysis, bivariate Granger causality were the methods used. The conclusion was that the risk (volatility) was higher in the conventional. There are no significant differences in risks adjusted return between both indices. However, the returns and risk associated with KLSI were lower than the KLCI.

Hassan and Girard (2010) examined the Dow Jones Islamic Market Index (DJIM) performance in seven countries and their corresponding conventional ones. Data of closing prices and monthly returns were collected from seven Islamic indices, and their corresponding conventional from January 1996 till December 2005. A variety of measures were used as Sharpe, Treynor, Jenson and Fama's selectivity, net selectivity and diversification. They found no significant differences between both Islamic and non-Islamic indices. Risk and return and

diversification benefits were the same for both indices.

Dharani and Natarajan (2011) analyzed the performance (risk and return) of the Nifty index and Nifty Shariah index in India. Daily closing prices of both and S&P CNX Nifty index and S&P CNX Nifty Shariah index were obtained from 2nd January 2007 till 31 December 2010. In order to test the mean returns of the differentiation between two indices, T-test, Sharpe index, Treynor Index and Jensen alpha were used. The outcomes of the study showed that there isn't any significant difference between the two indices in return. Also, Nifty Shariah index has been underperformed during the selected period. According to risk-adjusted return, both indices were underperforming concerning the risk-free rate of return. Both indices were performing in a similar manner.

Abbes (2012) investigated the characteristics and risk-adjusted return of 35 Islamic Indices and their corresponding conventional process among the developed (19), emerging (16), and Arab and GCC markets, concerning their risk (volatility) and return. The data was obtained from January 2002 till April 2012. T-test, GARCH, EGARCH, and CAMP models were used in the study. The results showed that the pattern of return was the same for both indices in developed and emerging markets. Concerning mean returns, there wasn't any significant statistical difference between Islamic indices and its corresponding conventional process, except for Italy and Australia. There was an asymmetric relationship between volatility and returns in both indices. Islamic indices were less risky and sensitive to markets movement, comparing to their corresponding conventional, except Norway, Canada, Australia, Brazil, Mexico and UAE.

Habib and Islam (2014) study compared between MSCI Islamic index performance in both Malaysia and India and their corresponding conventional Indices. The data of day-to-day closing prices of S&P BSE 500 Shariah Index and its corresponding were collected for eleven years from January 2003 till December 2013. Risk-adjusted monthly returns and average monthly returns were calculated to evaluate the indices' performance. Beta and standard deviation were calculated to evaluate the risk involved. The conclusion showed that the India Islamic index has underperformed (lower return, less volatile), while Malaysia Islamic index has outperformed (better return, more volatile), comparing to their corresponding conventional during the study period.

Reddy and Fu (2014) studied the difference in performance between Shariah stocks and conventional stocks in the Australian Stock Exchange (ASX). The data collected were the weekly stock prices and financial ratios of fifty Shariah stocks and fifty conventional stocks, data collected were from 2001 till 2013. In the study, Mann Whitney U-test and Independent Samples T-test, Sharpe ratio, and OLS regression were used. The conclusion showed that there was a statistically significant difference in risk between Islamic stocks and conventional, as Islamic stocks were riskier. Also, there was not any statistically significant difference in return between Islamic stocks and conventional process.

Karim (2014) studied the difference in performance between Malaysia Dow Jones Islamic Index (DJIM) and FSTE Bursa Malaysia Index (KLCI) in. The data collected were the daily stock prices from 2000 to 2011. In the study, Adjusted Jensen's Alpa Index Performance (AJAI), Treynor ratio, Sharpe ratio, and modified Sharpe Ratio was used. The conclusion showed that there was a statistically significant difference between both markets, the volatility of KLCI was greater. Also, the performance of Islamic stock was better than conventional stock one.

Rana and Akhter (2015) analyzed the performance (risk and return) of KMI 30 and KSE 100 for stock and conventional Islamic indices in Pakistan. Daily closing prices were obtained from July 2008 till 31 November 2013. GARCH-M, Sharpe ratio, Adjusted Jensen's Alpa Index Performance (AJAI), and Treynor ratio were used e used in the study. The outcomes of the study showed that there significant difference between the two indices in performance. Also, KMI 30 (Shariah complaint stock) has been underperformed during the selected period.

3. RESEARCH METHODS

3.1. Data collection

The data employed in this paper consists of daily prices of major stocks, futures and Shariah indices in both USA (S&P 500) and Malaysia (KLCI). For each index, four sets of prices were used. These prices were open, close, high and low prices. The time duration of using these prices differed according to the research question. The data was collected from Investing.com and finance yahoo.com.

For the USA, the data was collected from the S&P 500 index, S&P 500 futures index, and the S&P 500 Shariah index. To study and analyze the impact of introduction and trading of Futures index at 21 April 1982 on S&P 500 Index, the data was collected from January 1960 till December 2006 to cover 46 windows period (years). 23 years before the introduction of Futures index and 23 after the introduction. To examine and study the difference between the volatility of the same day for each year for S&P 500 index and S&P future 500 indexes, the data was selected from 1 January 1997 until 31 October 2017. It covers a 21windows period (21 years). To examine and study the difference between the volatility of the same day for each year for S&P 500 S&P future 500 index and Shariah index, the data was selected from 19 December 2006 (since the introduction of Shariah index) until 31 October 2017. It covers 11 windows period (11 years).

For Malaysia, the data was collected from the Kuala Lumpur Composite Index (KLCI), the Kuala Lumpur Composite Index Futures contract (KCIF), and Kuala Lumpur Shariah index (KLSI). To study and analyze the impact of the introduction and trading of Futures index on 15 December 1995 on the volatility of KLCI index, data was collected from January 1977 till December 2015 to cover 38 windows period (years). 19 years before the introduction of Futures index and 19 after the introduction. To examine and study the difference between the volatility of the same day for each year for KLCI index and KLCI futures, data were selected from 15 December 1995 (since the introduction of futures) till 31 October 2017. It covers 22 windows period (22 years). To examine and study the difference between the volatility of the same day for each year for KLSI index (Kuala Lumpur Shariah

Index) and KLCI futures index, the data was selected from January 2000 (since the introduction of Shariah index) till 31 October 2017. It covers 18 windows period (18 years).

3.2. Research methodology

There are many models used in different studies to examine if futures contracts result in increasing market destabilizing and make them riskier through measuring price volatility of the stocks and futures markets, such as ARCH, GARGH, GARCH (1,1), and EGARCH model. However, this study follows (Bacha & Villa, 1993; Ibrahim et al., 1999; Kar et al., 2000; Gupta, 2002; Saxena, 2012) four volatility measures (open to open prices, close to close prices, Parkinson extreme value estimator and Garman Klass Volatility (GKV)).

The first, measure is open to open prices. The daily return is calculated according to the equation:

$$R_t = Ln\ (O_t / O_t\text{-}1) \quad (1)$$

Where R_t is a symbol of the return in relation to day t, O_t is the opening price on day t and $(O_t\text{-}1)$ is the opening price on the day $(t\text{-}1)$. The variance and standard deviation of this return series are used to recognize the intraday volatility by using the following equations:

$$\sigma^2 = \Sigma\ (R_t - \overline{R})^2 / (N\text{-}1)$$
$$R = \Sigma\ (R_t) / N \quad (2)$$
$$t = 1$$

Open to open price volatility depends on the calculation of price volatility on the open price, which is the first traded price of a security in a certain trading day.

The second measure is close to close prices measure. The daily return (the logarithmic return) is calculated based on the equation:

$$R_t = Ln\ (C_t / C_t\text{-}1) \quad (3)$$

Where R_t is a symbol of the return in relation to day t, C_t is the closing price on day t and $(C_t\text{-}1)$ is the closing price on day $(t\text{-}1)$. Using standard deviation in the first two measures is helpful as it sum up the probability of finding any extreme value of return. When reports indicate high standard deviation, it means the possible positive or negative return is large. Close to close measure depends on the calculation of price volatility on the close price, which is the final traded price of security in a certain trading day (last until the opening in the next day price).

The third measure is Parkinson (1980) extreme value estimator (high and low volatility). The daily return (natural logarithm) is calculated based on day's highest and lowest prices, based on the equation:

$$Ln\ (H_t/L_t)$$
$$\sigma = K\sqrt{\sum Ln\left(\frac{H_t}{L_t}\right)^2 / N} \quad (4)$$

Where $k = 0.601$ (it is a fixed number in the equation based on the calculation of $(1/4\ ln(2))$ and H_t & L_t denote intraday high and low return respectively. High pricing is the highest traded price of a security in a certain trading day, while low price is the lowest traded price of a security in a certain trading day.

This type of measure is considered to be more efficient. The complexity of estimation correct volatility takes place when there is a shortage in constant price observation. This is the case in open and close price measure. The empirical study made by Beckers (1983) over the period 1973 to 1980 indicated that using Parkinson measure was more accurate and contained similar result (Dimo and Thomas, 1999).

The fourth measure is Garman – Klass Volatility (GKV). This measure uses four intra variation of prices (open, close, high, and low) and calculated based on the equation:

$$\sigma = \sqrt{\frac{1}{n}\sum((.5)\left(Ln9\left(\frac{Ht}{Lt}\right)\right)^2 - (2Ln(2)-1)\left(Ln\left(\frac{Ct}{Ot}\right)\right)^2} \quad (5)$$

Where H_t, L_t, C_t, and O_t denote intraday high, low, close, and open values respectively.

According to Wiggins cited in Ibrahim, et al. (1999), both Parkinson and GKV volatility measures resulted in little downward bias and more efficient than close to close measure.

Researchers assumed that increase the volatility of futures indices will be a sign of Gharar, which is unaccepted in Shariah. Any changes that occur during the period of the study and after the introduction and trade of futures result from futures trading only. So, researchers focused on the different indices' prices (open, close, high, and low), and used four volatility measures instead of using other models. As in this model, four types of prices are used (open, close, high, and low), and gives equal weight to all observation. In other models, one type of prices is used only, usually closed price only. Besides, these models assume that both negative and positive shocks will have the same result on volatility, which is not accurate. Also, they best run and use under stable market conditions. But in the selected period for both indices, the markets witnessed four stock downturns (2002, 2008, 2015, and 2016).

3.3. Research hypotheses

Different hypotheses should be examined to realize the study's aims and objectives as the following:

H_1: The introduction and trading of the future index do not lead to significant change in the volatility of the stock market for the selected period.

H_2: The differences between relative volatility in the future index and the stock market is not significant.

H_3: The differences between relative volatility in future index and Shariah index is not significant.

The statistical significance was tested by using the Levene Test at 5% significance level. Levene Test is an inferential statistic that is used to test if the variable of two or more groups has equal variance. It is used to prove the assumption that the variance across the sample is equal, which called the homogeneity of variance. If the significance value (*P-value),* which is resulted from Levene Test is greater than 0.05 ($p > 0.05$) then group variance can be considered as equal variance. If ($p < 0.05$), then group variance can be considered as unequal

variance, which violates homogeneity assumption. It is an alternative to Bartlett test as it is less sensitive to disappearances from normality.

4. EMPIRICAL RESULTS AND DISCUSSION

4.1. Effect of introduction and trading of futures index on the volatility of stock market

In this section, the effect of introduction and trading of futures on the stock market volatility will be discussed in both USA (as a developed country) and Malaysia (as an emerging country). In USA S&P 500 index is used to represent the stock market. The effect is examined since the introduction and trading of futures was on 21 April 1982. In Malaysia, the KLCI index is used to represent the stock market. The impact is examined since the introduction of futures was on 15 December 1995.

The results indicate that the spot market's volatility marginally higher as a result of the introduction and trading of futures index for nearly all the windows periods in both countries. The following Table 1 shows the results of testing whether the volatility of the stock market is significantly higher or lower for different periods after the introduction and trading of S&P future 500 index during the period 1960 till 2006. Also, introduction and trading of futures index on the KLCI index during the period 1977 to 2017, with respect to open to open volatility measured by *(Ln* $(O_t/O_t\text{-}1)$*)*, close to close volatility measured by *(Ln* $(C_t/C_t\text{-}1)$*)*, and Parkinson's Extreme Measure by *(Ln* (H_t/L_t)*)* respectively for several window period before and after. The summary of the empirical results of the statistically significant test at 5% level of significance is followed in Table 1.

Table 1. Impact of introduction of futures index on stock market volatility

Volatility measures	*USA (S&P 500)*	*Malaysia (KLCI index)*
(Ln $(O_t/O_t\text{-}1)$*)*	19 out of 23 years that represents 84% of the windows period's results (selected period) show that the volatility of the spot market marginally higher after the introduction of futures index. 15 out of 23 years that represents 65% of windows period's results are statistically significant (significant difference between before introduction of futures contracts and after the introduction of futures contracts); 84% of these results are significantly related to increasing the volatility of stock market after the introduction of future. Meanwhile, 8 out of 23 years that represents 35% of the windows period's results are statistically insignificant.	17 out of 19 years that represents 90% of the windows period's results (selected period) show that the volatility of the spot market marginally higher after the introduction of futures index. 15 out of 19 years that represents 74% of windows period's results are statistically significant (significant difference between before introduction of futures contracts and after the introduction of futures contracts); 75% of these results are significantly related to increasing the volatility of stock market after the introduction of future. Meanwhile, 4 out of 19 years that represents 26% of the windows period's results are statistically insignificant.
(Ln $(C_t/C_t\text{-}1)$*)*	19 out of 23 years that represents 84% of the windows period's results show that the volatility of the spot market marginally higher after the introduction of futures index. 16 out of 23 years that represents 70% of the windows period's results are statistically significant; 82% of these results are significantly related to increasing the volatility of the stock market after the introduction of futures. Meanwhile, 7 out of 23 years that represents 30% of the windows period's results are statistically insignificant.	16 out of 19 years that represents 85% of the windows period's results show that the volatility of the spot market marginally higher after the introduction of futures index. 15 out of 19 years that represents 74% of the windows period's results are statistically significant; 70% of these results are significantly related to increasing the volatility of the stock market after the introduction of futures. Meanwhile, 4 out of 19 years that represents 26% of the windows period's results are statistically significant.
(Ln (H_t/L_t)*)*	20 out of 23 years that represents 87% of the windows period's results show that the volatility of the spot market marginally higher after the introduction of futures index. 17 out of 23 years that represents 74% of the windows period's results are statistically significant; 82% of these results are significantly related to increasing the volatility of the stock market after the introduction of futures. Meanwhile, 6 out of 23 years that represents 26% of the windows period's results are statistically insignificant.	The volatility of the spot market shows marginally higher after the introduction of futures index for all the windows period. The results are statistically significant at the 5% level of significance for almost all the windows period except year 1.

The results of both markets (USA and Malaysia) are consistent with other prior studies (Lockwood and Linn, 1990; Antoniou and Holmes, 1995; Gulen and Mayhew, 2000; Bae et al., 2004; Koustubh and Ajaya, 2001). These studies showed an increase in the stock market volatility after introduction and trading of future indices. As a result, the first hypothesis (H_1) is rejected (the introduction and trading of the future index do not lead to change stock market's volatility for the selected period). The introduction and trading of future index lead to change the stock market's volatility to be higher for the selected period.

These results support the opponent of derivatives. The results illustrated that futures derivatives lead to increase risks in the markets through increase price volatility (Hellwig, 1980; Cox, 1976; Figlewski, 1981). The fluctuation of prices makes the markets unstable and destabilize, which violate Shariah. It contains Gharar and encourages speculators and ends with gambling. Consequently, futures are not accepted from Shariah law (Obidullah, 1988, 1999; Khan, 1988; Al-Suwailem, 2006; Usmani, 2010; Ayyash, 2008; Danila et al., 2010; Jobst & Solé, 2012; Sakti et al., 2016).

4.2. Futures vs. stock market volatility

Empirical results are sought to be answered the second question, which compares between the volatility of the same day for each year for both S&P 500 index and S&P future 500 indexes. The selected data was from 1 January 1997 until 31 October 2017. For KLCI index and KLCI futures index the data was selected from 15th December 1995 till 31 October 2017. The analysis used four volatility measures, which are open to open volatility measured by *(Ln (O_t/O_t-1))*, close to close volatility measured by (*Ln (C_t/C_t-1))*, high and low volatility measured by *Ln ((H_t/L_t))*, and GKV volatility measured for several window periods.

The results indicate that the future volatility was almost higher than stock volatility for almost all the windows period in both countries. The following Table 2 shows the results of testing whether the volatility of futures index is significantly higher or lower than spot index for the selected period in both markets. The empirical results of the statistically significant test at 5% level of significance are followed in the Table 2.

Table 2. Futures vs. stock market volatility

Volatility measures	*USA (S&P 500)*	*Malaysia (KLCI index)*
(Ln (O_t/O_t-1))	The future volatility was higher for 18 out of 21 years that represents 85% of the selected period. 15 out of 21 years that represents 72% of windows period's results are statistically significant (significant difference between the volatility of futures index and spot index); 87% of these results are significantly illustrated that the future volatility was higher than stock volatility. Meanwhile, 6 out of 21 years that represents 28% of the windows period's results are statistically insignificant.	The future volatility was higher for 17 out of 22 years that represents 78% of the selected period. 15 out of 22 years that represents 68% of windows period's results are statistically significant (significant difference between the volatility of futures index and spot index), 74% of these results are significantly illustrated that the future volatility was higher than stock volatility. Meanwhile, 7 out of 21 years that represents 32% of the windows period's results are statistically insignificant.
(Ln (C_t/C_t-1))	The future volatility was higher for 18 out of 21 years that represents 85% of the selected period. 19 out of 21 years that represents 91% of the windows period's results are statistically significant, 80% of these results are significantly illustrated that the future volatility was higher than stock volatility. Meanwhile, 2 out of 21 years that represents 9% of the windows period's results are statistically insignificant.	The future volatility was higher for 20 out of 22 years that represents 91% of the selected period. 19 out of 22 years that represents 87% of the windows period's results are statistically significant, 95% of these results are significantly illustrated that the future volatility was higher than stock volatility. Meanwhile, 3 out of 22 years that represents 13% of the windows period's results are statistically insignificant.
(Ln (H_t/L_t))	The future volatility was higher for 19 out of 21 years that represents 91% of the selected period. 16 out of 21 years that represent 76% of the windows period's results are statistically significant, 75% of these results are significantly illustrated that the future volatility was higher than stock volatility. Meanwhile, 5 out of 21 years that represents 24% of the windows period's results are statistically insignificant.	The future volatility was higher for 19 out of 22 years that represents 87% of the selected period. 20 out of 22 years that represents 91% of the windows period's results are statistically significant, 95% of these results are significantly illustrated that the future volatility was higher than stock volatility. Meanwhile, 2 out of 22 years that represents 9% of the windows period's results are statistically insignificant.
GKV	The future volatility was higher for 19 out of 21 years that represents 91% of the selected period. 16 out of 21 years that represents 76% of the windows period's results are statistically significant, 75% of these results are significantly illustrated that the future volatility was higher than stock volatility. Meanwhile, 5 out of 21 years that represents 24% of the windows period's results are statistically insignificant.	The future volatility was higher for 22 out of 22 years that represents 100% of the selected period. 18 out of 22 years that represents 82% of the windows period's results are statistically significant, 89% of these results are significantly illustrated that the future volatility was higher than stock volatility. Meanwhile, 4 out of 22 years that represents 18% of the windows period's results are statistically insignificant.

The results of the four measures are similar. Almost all windows show that future volatility was higher and almost all the results were statistically significant. The differences between relative volatility in the future index and the stock market are significant, which indicates that the second hypothesis needs to be rejected (there isn't any significant difference between the underlying stock market and futures market). These results are somehow similar to other ones reported by researches for developed markets as (Chu & Bubnys 1990; Yadav & Pop., 1990; Koutyos & Tucker, 1996) and for emerging markets, i.e. the Malaysian market as (Bacha & Villa, 1993; Ibrahim et al., 1999).

The results of both markets (USA and Malaysia) support the opponent of futures. Reports stated that futures are riskier than spot markets. Its volatility is higher than spot markets, which results in increasing risks, diverging futures from its original purpose of hedging risks. Thus, futures markets are unstable and destabilize, which violate Shariah as it contains Gharar and encourage speculators and ending with gambling. Consequently, futures are not accepted from Shariah law (Obidullah, 1988, 1999; Khan, 1988; Al-Suwailem, 2006; Usmani, 2010; Ayyash, 2008; Danila et al., 2010; Jobst & Solé, 2012; Sakti et al., 2016).

4.3. Futures vs. Shariah volatility

Empirical results were sought to answer the third question, which compares between the volatility of the same day for each year for both S&P future 500 indexes and S&P 500 Shariah index. The selected data was from 19 December 2006 until 31 October 2017. For KLSI index (Kuala Lumpur Shariah Index) and KLCI futures index the data selected from 2000 till 31 October 2017. The analysis used four volatility measures, which are open to open volatility measure *(Ln (O_t/O_t-1))*, close to close volatility measure *(Ln (C_t/C_t-1))*, high and low volatility measure *(Ln (H_t/L_t))*, and *GKV* volatility measure.

These measures helped to test whether the futures index is more or less volatile than the Shariah market index in both markets.

The results indicate that the volatility of futures was almost higher than Shariah volatility for almost all the windows period in both countries. The following Table 3 shows the results of testing whether the volatility of futures index is significantly higher or lower than Shariah index for the selected period in both markets. The summary of the empirical results of the statistically significant test at 5% level of significance is followed in Table 3.

Table 3. Futures vs. Shariah volatility

Volatility measures	*USA (S&P 500)*	*Malaysia (KLCI index)*
(Ln (O_t/O_t-1))	The future volatility was higher for 7 out of 11 years that represents 64%, and lower for 4 out of 11 years that represents 36% of the selected period; these years are the second, third, ninth, tenth years. All of these results are statistically insignificant at statistical significance rate of 5%.	The future volatility was higher for 14 out of 18 years that represents 78% and lower for 4 out of 18 years that represents 22% of the selected period; these windows are the third, fourth, tenth, seventieth years. All of these results are statistically insignificant at statistical significance rate of 5%.
(Ln (C_t/C_t-1))	The future volatility was higher for 7 out of 11 years that represents 64%, and lower for 4 out of 11 years that represents 36% of the selected period; these years are the first, second, ninth, tenth years. All of these results are statistically insignificant at statistical significance rate of 5%.	The futures volatility was higher for 13 out of 18 years that represents 73%, and lower for 5 out of 18 years that represents 27% of the selected period; these windows are the third, ninth, tenth, sixteenth, seventeenth years. All of these results are statistically insignificant at statistical significance rate of 5%.
(Ln (H_t/L_t))	The future volatility was higher for 10 out of 11 years that represents 91% and lower only for one year that represents 9% of the selected period; which is the ninth year. All of these results are statistically insignificant at statistical significance rate of 5%.	The futures volatility was higher for 13 out of 18 years that represents 73% and lower for 5 out of 18 years that represents 27% of the selected period; which are the third, ninth, tenth, sixteenth, seventeenth years. All of these results are statistically insignificant at statistical significance rate of 5%.
GKV	The future volatility was almost higher in all windows, for 10 out of 11 years that represents 91% and lower only for 1 out of 11 years that represents 9% of the selected period; this year was the tenth year. 10 of 11 years that represents 91% of windows period's results are statistically insignificant, and 1 of 11 years that represents 9% of windows period's results is statistically significant; this window period was the eleventh year. All at statistical significance rate of 5%.	The future volatility was higher for almost all windows 15 out of 18 years that represents 83% and lower only for three years 3 out of 18 years that represents 17% of the selected period. These windows are the tenth, sixteenth, seventeenth years. All of these results are statistically insignificant at statistical significance rate of 5%.

The results of the four measures are more or less similar in both countries (USA, Malaysia). Almost all windows show that future volatility was higher than Shariah, and almost all the results are statistically insignificant, which suggested accepting the third hypothesis (there isn't any significant difference between the Shariah market and futures market). These results are somewhat similar to others researches which examine the performance between Shariah and stocks indices. Prior results showed that the risk of Shariah index was less than the stocks index (Ahmad & Ibrahlm, 2002; Albaity & Ahmad, 2008; Hassan & Girard, 2010; Dharani & Natarajan, 2011; Abbes, 2012).

However, the volatility of Shariah index was higher at some periods. This happens to coincide with the same year of a stock downturn or with the following year of the stock downturn. The following Tables (4, 5) show the years at which the Shariah index was higher and how it was associated with a stock downturn in USA and Malaysia respectively.

Table 4. Volatility of Shariah index and stock downturn in the USA

Year	*Stock downturn*
Second year	2008 financial crisis
Third year	2009 the following year of a financial crisis
Ninth year	2015 stock downturn
Tenth year	2016 stock downturn

Table 5. Volatility of Shariah index and stock downturn in Malaysia

Year	*Stock downturn*
Third year	2002 stock downturn
Ninth year	2008 financial crisis
Tenth year	2009 the following year of a financial crisis
Sixteenth year	2015 stock downturn
Seventieth year	2016 stock downturn

This phenomenon needs more investigation and analysis to explore whether the increase of the volatility in Shariah indices is because of investors or speculators movements. The increase of Shariah volatility could be the result of the investors shift to find shelter from stock downturns and to protect them from fluctuation in prices and risks, which associated with stock downturns. Shariah index is

less affected by any downturn. They are less risky and safer than futures. The increase in volatility is a result of the speculation activities, which turn into Shariah indices to get the advantages of prices' differences. Besides, if the traded assets and commodities in the Shariah index satisfy Shariah laws, the process and mechanism of the index should be done in a way fulfilling Shariah laws also.

The results of both markets (USA and Malaysia) support many researchers who consider the Shariah instruments and indices are similar to conventional (they do not completely satisfy Shariah laws), but it is a means of circumventing the Shariah recommends (Khan, 1997; Ghoul, 2008; Ayoub, 2013; Abozaid, 2014; Nadhirah et al., 2015).

5. CONCLUSION

The main purpose of futures is managing and shifting risks that are associated with the fluctuation in the prices, hedging strategy, and aids market stabilization. However, the results indicated the opposite. The reported results support the opponents of futures, who stated that futures make the markets unstable and destabilize, by increasing risks in the markets through increase prices' volatility. Futures markets are riskier than spot markets as this fluctuation of prices and increase risks volatility of futures than spot indicate that the futures have been diverted from its original purpose of hedging and risk management and become tools of speculation. Thus, futures indices involve excessive risks (Gharar), which void the contracts, encourage speculation activities, and ending with other prohibited element gambling. Besides, the financial crises in Asia and the USA are proofs of how the futures lead to major problems that affect badly the global financial sector.

Although the Islamic indices have more strict checking and examination process than conventional and futures, however, the reported results showed that the Shariah indices are not different from Futures, only the name changed by an Islamic one. The futures' volatility was higher in almost all periods. In some years, the volatility of Shariah indices was higher in both countries, which coincides with the stock downturn (2002, 2008, 2015, 2016). This needs an additional investigation to find out the reasons behind the rise of the volatility of Shariah indices compared to futures ones.

It is not enough that the forms and structure of the contract, process, and mechanism of the market fulfil the Shariah rules. It may be valid but not permissible. These contracts must also fulfil the Shariah objectives and principles that guarantee the welfare and prosperity of the society as a whole. In this way, the contract will be valid and permissible.

Researchers wanted to study the effect of the introduction of futures as a sign of Gharar on the market in Egypt. There is no future market in Egypt, although it was one of the leading countries in the futures literature. Also, one of the limitations that should be addressed is that researchers wanted to link the results of the existence of Gharar in the futures markets in the USA and Malaysia with speculation ratios in both countries. However, the required data especially in Malaysia for the selected period will cost almost $12000, which is costly and couldn't be afforded. Therefore, there was a problem with data availability that made researchers rely on other sites and other sources to get all the available data.

For further researches, a focus can be given to relating speculation ratios and the existence of Gharar in the futures markets in USA and Malaysia by measuring the effect of speculation ratios on the existing of Gharar in futures indices. In addition, researches can investigate whether the options as financial derivatives are accepted from an Islamic perspective by measuring the volatility of the markets and connecting them with speculation ratios. Also, some studies can investigate the accessibility of financial derivatives (mainly futures and options) from Shariah's risk management perspective by measuring risks' inevitability, insignificance, and unintentionally. Other studies can investigate the reasons behind the increase in volatility of Shariah indices (S&P and KLSI) more than futures indices (S&P 500 and KLCI) according to the results generated from the study. Also, an investigation can be conducted to study the effect of different events in the futures indices on the performance of Shariah indices. Finally, researches can determine the demand of Salam and Istisnaa instruments in various businesses and economic sectors in Egypt.

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