International Journal of Business and Society, Vol. 24 No. 1, 2023, 1-17

IMPACT OF DERIVATIVES USER ON FIRMS' PERFORMANCE OF SHARI'AH COMPLIANT FIRMS

Zaminor Zamzamir@Zamzamin[♣]
University of Malaysia Kelantan

Razali Haron
International Islamic University Malaysia

Zatul Karamah Ahmad Baharul Ulum
University of Sultan Azlan Shah

Anwar Hasan Abdullah Othman
Independent Researcher

ABSTRACT

The study examined the impact of derivatives usage on the performance of Shari'ah-compliant firms in Malaysia. The study employed a Generalised Method-of-Moment estimator (System-GMM) on a set of panel data from 2012 to 2017. A paired sample t-test for mean difference and a Wilcoxon Signed-ranks test was performed to examine the performance difference between users and non-users of derivatives. The study provided strong evidence of a significant difference in performance between users and non-users of derivatives. Moreover, the study observed better performance among derivative users than non-derivative users. The findings enriched the current Islamic financial market literature and contributed to a better understanding of the hedging activities among Shari'ah-compliant firms. The study offered new evidence on risk management using derivatives in the Islamic financial market.

Keywords: Risk management, derivatives, hedging, firm performance, user and non-user, Shari'ah-compliant firms.

Received: 17 August 2020
Accepted: 7 April 2022
https://doi.org/10.33736/ijbs.5594.2023

1. INTRODUCTION

Firms risk management practices are meant to reduce risk. Understanding firms most critical risk encourages stakeholders such as managers to take the appropriate step to minimise the adverse effects of risk on firm value. A significant growth in derivatives usage was reported recently among firms worldwide where non-financial firms have been using derivatives as risk management tools. Thus, derivatives have become the most effective and efficient tool for corporate hedging (Bartram,

♣ Corresponding author: University of Malaysia Kelantan, 16100 Kota Bharu, Kelantan, Malaysia. Tel: +060192200547; Email: zaminor@umk.edu.my

2019). Nevertheless, the collapse of several well-established and prominent US banks, such as Lehman Brothers, Merrill Lynch and National City Bank raised many concerns regarding the effectiveness of risk management using derivatives. Risk management failures in the organisations led to their collapse as evident during the 2008 financial crisis. For instance, Brazilian firms collapsed due to the risk management failure (Antônio et al., 2019), while 12 countries incurred derivatives losses due to poor risk management strategies (Dodd, 2009). The 2008 global financial crisis has emphasised risk management using financial derivatives among academic researchers (Zeidan & Rodrigues, 2013).

Improved reporting information on derivatives activities is imperative following the collapse of several firms due to improper risk management, specifically due to scandals involving huge derivatives losses (Bae et al., 2018; Blankley et al., 2002). The awareness of derivative usage among firms in Malaysia remains low and most managers do not understand the function and the importance of derivatives as a hedging instrument, particularly during economic uncertainties. Managers lack interest in using derivatives due to the struggle in understanding the complexity of derivatives and a low capacity to manage derivative instruments (Ameer et al., 2012). Ameer et al. (2011) stated that derivative practices among Malaysian firms are not as extensive as those in developed countries following a lack of exposure to derivative products. Lau (2016) reported a mere 26.8% of Malaysian firms had derivative contracts in their operation, while the remaining did not use any derivatives.

The Asian financial crisis has influenced the Malaysian scope of derivative instruments. The Securities Commission of Malaysia (SC) post-2008 global financial crisis stated that Bursa Malaysia (the stock exchange) has announced public listed company requirements to release information regarding the use of derivatives in their financial statements to rebuild investors' confidence. Bursa Malaysia obligates listed companies to follow the International Financial Reporting Standard (IFRS) in disclosing and reporting information on investment and financial derivatives in their financial statements. The practise aligns with the International Accounting Standard (IAS 7), which entails listed companies to report their intention on derivatives for hedging. Despite the requirement, Abdullah and Ismail (2017) discovered that only 29.6% (48 firms) of the Malaysian listed firms provided information on their derivative positions, while the remaining firms failed to do so.

Many firms encounter various types of risk and every firm practices a different approach and technique to manage the risks. Hence, most firms will engage in derivatives instruments as a way to manage risks. Nevertheless, some firms do not use derivatives despite their importance in derivatives for risk management (Lau, 2016). For example, Zamzamir@Zamzamin et al. (2021) documented that only 59 out of 177 Shari'ah-compliant firms in Malaysia use derivatives to manage risk. Moreover, Wahab et al. (2019) discovered that merely 123 non-financial firms in Malaysia have practised hedging positions between 2010 and 2017. Ameer (2009) recorded 298 firms in Malaysia that do not engage in any form of hedging instruments. Meanwhile, Ameer et al. (2011) highlighted derivatives usage among Malaysian listed firms is significantly lower than firms in the developed countries. The phenomenon is also emphasised by Lau (2016) who discovered that 498 out of 680 non-financial firms listed under Bursa Malaysia did not report any derivatives exposure from 2002 to 2012.

The development of the Islamic financial industry is essential for the global financial system. The IFCI (2019) mentioned that the Islamic financial asset was valued at USD $2.431 trillion at the end of 2017 and increased to approximately USD $2.591 trillion by the end of 2018. Moreover, Malaysia has become an influential country in global Islamic Finance. Malaysia also ranked first in the Islamic Finance Development Indicator (IFDI) for 2020 (Islamic Finance Development Indicator Report, 2021). The IFDI is a composite index that measures the overall development of the Islamic finance industry, including quantitative development, knowledge, governance, corporate social responsibility, and awareness. Financial derivatives have become popular as risk management instruments and are regularly traded over the counter (OTC) by financial and non-financial institutions. Thus, Shari'ah-compliant firms must engage with the latest risk management instruments and skills to overcome the current financial environment challenges. Arif, Muda, Alam and Mohamad (2019) reported one of the key concerns that could threaten Islamic risk management tools in the financial market is the attitude of managers in relying on the current structure of conventional instruments. Additionally, hedging practices among Shari'ah-compliant Malaysian firms are underexplored and lag behind firms in developed countries (Wahab et al., 2020). Mohamad et al. (2014) reported that although firms are categorised as Shari'ah-compliant firms, their risk management in dealing with market uncertainties remains at the infancy stage with limited use of hedging instruments.

Abdul-Rahim et al. (2019) documented that Shari'ah-compliant firms are twice as likely as conventional firms to adopt hedging instruments and the Shari'ah-compliant status does not hinder them from using the contractual hedging instruments to mitigate risk exposure. Islamic risk management instruments exhibited positive growth based on the average volume of foreign exchange forward transactions (Bank Negara Malaysia, 2017). Malaysia is the leading country in Islamic finance with the most advanced Islamic capital market (Ledhem & Mekidiche, 2020). According to Mitchell (2010), one of the factors contributing to the 2008/2009 financial crisis is risk management failure. Ahmed (2009) added that risk management failure at various levels contributed to the financial crisis. Therefore, Islamic finance becomes an alternative to the conventional financial system shortcomings (Nafis & Mohammad Shadique, 2016). Nafis and Mohammad Shadique (2016) also stated that Islamic finance is more resilient than conventional finance during the financial crisis as reaffirmed by Baber (2018). Consequently, the financial crisis has emphasised the weakness of the conventional financial system and the potential of Islamic finance as an alternative.

Jobst (2013) stated that regardless of Islamic finance rapid development, the rising opportunity cost due to limited Shari'ah-compliant risk transfer methods has raised doubts on the effective risk management strategies in Islamic finance. Moreover, the firms need to engage in derivatives for hedging purposes, specifically Islamic derivatives. Thus, the study aims to compare the difference in performance between user and non-user of derivatives among Shari'ah-compliant firms. The study also examined the impact of derivatives usage on the performance of the two firm categories. Derivatives will act as a hedging instrument, specifically during the crisis period, thus ultimately resulting in optimum firm performance (Bae et al., 2018).

The study differs from previous studies in several aspects. First, previous studies only focused on listed Malaysian firms in general, while the current study focused on Shari'ah-compliant firms and examined the risk management aspects of users compared to the non-users of derivatives. The study fills the gap in the prevailing literature following the mixed results and lack of studies on

Shari'ah-compliant firms risk management using derivatives. Second, the current study employed various firm value measurements for robustness and utilised the appropriate methodology that addresses the endogeneity issue in panel data.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Derivative instruments developed at a spectacular pace during the 1980s and 1990s. The derivative instruments comprise forward exchange contracts, swaps, futures, and options. Many firms have actively participated in derivative markets due to the rapid growth of the instruments. Allen and Santomero (1998) noted the extensive increase in the diversity of exchange-traded and over-the-counter (OTC) derivatives. Mian (1996) discovered that firms hedge to reduce the effect of uncertainties on firm value. Prior to Stulz's (1984) introduction of the hedging theory, most scholars refer to and rely on Modigliani and Miller's (MM) classical paradigm. The traditional paradigm indicates that firms financial policy decisions impact firm value (Modigliani & Miller, 1963).

Nevertheless, scholars debated the limitation of the MM paradigm in explaining firm risk management strategies. Hence, Stulz (1984) introduced a theory where hedging using derivatives can increase firm value and is a value-enhancing activity. Froot and Scharfstein (1993) explained that hedging aids firms in possessing sufficient internal funds to avoid fluctuation in risk, thus protecting firm value. Demarzo and Duffie (1995), Froot et al. (1993), and Smith and Stulz (1985) argued that tax incentives, underinvestment costs, expected cost of financial distress, asymmetric information, and managerial compensation could increase firm value through hedging. Moreover, the hedging strategy emphasises the function of contraction cost and capital market imperfections. Smith and Stulz (1985) suggested that hedging is useful during market imperfection. Similarly, Froot et al. (1993) mentioned that hedging position is essential when external financing costs correlate with capital market imperfection.

From the Islamic perspective, hedging is a method of precaution or minimising loss from constant risks in the financial market. Numerous Quranic verses provide guidelines and suggest risk management in life. A section in the Quran discusses the financial context of risk management, hence implying that risk management and hedging are significant, as mentioned in Surah Yusuf (12:47-48):

> Yusuf conveyed, "You will plant for seven years consecutively; and what you harvest leave in its spikes, except a little from which you will eat. Then after that seven difficult (years), which will consume what, you save for them, except a little from which you will store. Then will come after that a year in which the people will be given rain and in which they will press (olive and grapes)".

Prophet Yusuf translated the King's dream based on the verse. After seven years of prosperity in Egypt, the Kingdom will experience seven years of dry season and the Prophet recommended the King strategize the economy of the country to overcome the upcoming disaster. Specifically, Egyptians must prepare for planting the crops and store as much as possible to prepare for the long seven years of drought. Consequently, the people were able to survive when the dry season occurred for seven years (Kathir, 1988). Therefore, risk management is vital to prevent destruction.

The derivatives market has grown rapidly globally and derivatives hedging is popularly used as firms major risk management device (Perez Gonzalez & Yun, 2013). Nonetheless, past literature has presented mixed evidence on the impact of derivatives on firm performance. For instance, Antônio et al. (2019) reported that the earnings of derivative users are more predictable than non-users, which is more volatile. Nguyen and Liu (2014) revealed that derivative users outperformed non-users. Bodnar et al. (2003) noted only 40% of US firms engaged in derivatives compared to 60% of Dutch firms.

Guay (1999) examined the user and non-user of derivatives and discovered that firms use derivatives to hedge firm risk. Furthermore, Shen and Hartarska (2013) observed that derivatives activities minimise the negative effect of risk exposure and protect firm value during the 2008 financial crisis. Additionally, the performance of derivatives user was improving over time. Similarly, Allayannis and Weston (2001) examined 720 non-financial firms between 1990 to 1995 and noted that foreign currency derivative users performed consistently better than non-users. Bartram et al. (2011) reported that the stock return of derivative users is higher and less volatile than non-users with lower market risk than non-users. Nguyen and Liu (2014) revealed that derivative users of Australian non-financial firms out-performed the non-users. Conversely, Lau (2016) discovered that Malaysian firms engaged in derivatives were negatively related to performance, as confirmed in Ben Khediri (2010) and Nguyen and Faff (2010a). Hentschel and Kothari (2001) failed to prove the lower risk among derivative users compared to non-users.

Hedging through derivatives could be an effective and essential risk management strategy despite the mixed evidence in studies. Bhagawan and Lukose (2017) stated that firms with higher foreign exchange exposure tend to engage more in derivatives. Belghitar et al. (2013) disclosed that derivative instruments are effective in reducing foreign currency risk exposure, while Bouwman (2014) mentioned that firms use derivatives effectively for risk management. Antônio et al. (2019) reported that firms use derivatives for protection. Chong et al. (2014) also discovered that the use of derivative instruments is to minimise risk and increase firm value, consistent with Bartram et al.'s (2011) study on non-financial firms in 47 countries. Ameer (2009) noted that only a few Malaysian firms hedged market risk and improved their earnings through the use of derivatives. Othman and Ameer (2009) highlighted that most Malaysian firms did not engage in hedging to minimise market risk from 2006 to 2008. Moreover, the types of hedging instruments used by the firms are determined by their sector.

In contrast, Brunzell et al. (2011) suggested that firms use derivatives more for profit than for hedging. Bae et al. (2017) stated that foreign currency derivatives failed to increase firms profitability. Bae and Kim (2016) added that the heavy usage of foreign currency derivatives by Korean firms has produced lower firm risk but failed to increase firm value. Similarly, Magee (2013) noted the absence of a relationship between foreign currency derivatives and firm value. Gay, Lin and Smith (2011) observed that firm performance is negatively significant to derivatives hedging. The study hypothesised the following hypotheses based on the mixed findings on derivate users and non-users:

H1: There is a significant difference in performance between derivative users and non-users in Shari'ah-compliant firms.

H2: The Shari'ah-compliant firms engaged in derivatives perform better than non-users.

3. DATA AND RESEARCH METHODOLOGY

3.1. Sample Selection

The study sample data include non-financial Shari'ah-compliant firms engaged in derivatives from 2012 to 2017. Firms engagement in derivatives was identified by referring to their annual reports in the off-balance sheet section in accordance with the MFRS 7 (Financial Instrument Disclosure) standard of reporting of financial instruments and disclosure. Shari'ah-compliant firms were selected based on the Securities Commission (SC) in Malaysia from a total of 905 firms listed in the main market of Bursa Malaysia as of December 2017. After the filtering process, only 177 Shari'ah-compliant firms were selected for the sample and divided into two sections, namely derivates users and non-users. A total of 59 Shari'ah-compliant firms were classified as users of derivatives while 118 firms were non-users. The engagement in derivatives is irrespective of any years during the study period regarding derivative users. Although the sample firms were smaller than the 250 firms in Nguyen and Faff (2010b), the sample is higher than Linsley and Shrives (2006) who analysed a sample of 79 UK firms and the 77 Australian firms by Nguyen and Faff (2002).

The study adopted certain criteria accordingly for the sampling of Shari'ah-compliant firms. Ramli and Haron (2017) and Zamzamir@Zamzamin et al. (2021) proposed that a firm must consistently be a Shari'ah-compliant firm for it to be included in the study sample. The criterion contrasts with the selection of Shari'ah-compliant firms based on a specific cut-off year, such as only based on December 2017 as per SC Shari'ah-compliant listing. Moreover, the consistency in Shari'ah-compliant listing is essential as it reflects the firms real Shari'ah-compliant status based on SC revised Shari'ah screening process introduced in 2012. The study adopted the consistency of the Shari'ah status of the firms during the study period for its sampling. Additionally, financial institutions were excluded due to the different set of rules and guidelines from relevant authorities, such as the Central Bank of Malaysia.

3.2. Dependent Variables

The two study objectives are (i) to examine the difference in performance between derivative users and non-users in Shari'ah-compliant firms, and (ii) to examine whether derivative users perform better than non-users.

Tobin's Q represents firm performance (dependent variable), defined as equity market capitalisation (market value) plus total liabilities (book value) over total assets (book value) (Allayannis et al., 2011, Ayturk et al., 2016, Haron et al., 2020). The data on firm performance was collected from the DataStream database. The study used return on assets (ROA) and return on equity (ROE) to measure firm performance and the robustness check and alternative measurement.

3.3. Explanatory Variables

The proxy for explanatory variable is the probability whether the firm is a derivates user or non-user. Derivatives use during the study period acts as a proxy for hedging and the risk management practice of Shari'ah-compliant firms. The study included exchange rate forward, currency swaps and currency option as currency derivatives, interest rate swaps and interest rate options as interest

rate derivatives, and commodity price forward and commodity option as commodity derivatives. All the categories of derivatives are used by the Shari'ah-compliant firms during the study period. Derivatives use is a dummy variable that equals "1" if a firm reports any form of derivatives activities and "0" otherwise based on Afza and Alam (2011), Chong et al. (2014), Dionne et al. (2018), Lau (2016), Nguyen and Faff (2002), and Tanha and Dempsey (2017).

3.4. Control Variables

The control variables included in this study are as follows:

i. Managerial ownership
Adam and Fernando (2006) discovered that managerial ownership influences risk management decisions and firm value, confirmed by Fahlenbrach and Stulz (2009) and Coles, Lemmon and Felix Meschke (2012). Ameer (2010) noted a significant relationship between managerial ownership and firm value of Malaysian firms. Meanwhile, Seng and Thaker (2018) mentioned that managers take less hedging positions when they owned more shares, hence confirming a significant negative relationship between managerial ownership and corporate hedging and firm value of Malaysian firms. Supanvanij and Strauss (2010) stated that managerial ownership is negatively related to firm hedging positions. Managerial ownership is measured based on directors' total shareholding (direct) over the total common shares outstanding at the end of each year (Ahmad & Haris, 2012; Ameer, 2010; Haron et al., 2020).

ii. Leverage
The firm's capital structure affects firm value. Thus, the study used long-term debt divided by total shareholder's equity to control capital structure (Allayannis et al., 2011; Allayannis & Weston, 2001; Ayturk et al., 2016; Jin & Jorion, 2006; Panaretou, 2014).

iii. Firm size
Firm size influences firm value. Past studies reported that firm size demonstrated a significant positive relationship with hedging decisions, hence increasing firm value (Allayannis et al., 2011; Lau, 2016; Magee, 2013). Nonetheless, Allayannis and Weston (2001) and Ayturk et al. (2016) revealed that firm size is negatively related to firm value. The proxy for the firm size is the natural logarithm of total assets.

iv. Access to financial market
Firm value remains high if a firm omits projects due to failure to obtain the necessary financing and the uncertainty of the net present values (NPVs) of the projects because only positive projects are being pursued (Lau, 2016). Allayannis and Weston (2001) and Magee (2013) mentioned that firms paying dividends are less likely to experience capital constraints and can reduce its dividend to increase investment. The study followed Lau (2016) and Allayannis and Weston (2001) where the proxy for the access to the financial market is firm that pays dividend in the present year equals "1" and "0" otherwise.

v. Firm risk
Past findings revealed that heavy use of foreign currency derivatives by Korean firms leads to lower firm risk and higher firm value (Bae et al., 2017). Choi et al. (2013) discovered that firms engaged in derivatives exhibited lower firm risk and higher firm value. Hence, the

measurement of firm risk is based on the average standard deviation of daily stock returns of the year and annualised to yearly returns.

vi. Industrial diversification
Industrial diversification influences firm performance. Highly diversified industries hold a higher value than low diversified industries (Allayannis & Weston, 2001; Ayturk et al., 2016; Bae et al., 2017; Bartram et al., 2011; Nguyen & Faff, 2010b). The study employed the Herfindahl-Hirschman Index (HH Index) to control the effect of industrial diversification adopted by Berger and Ofek (1995), Lang and Stulz (1994), and Servaes (1996). The estimation of the HH index was calculated from firm sales by segment. The HH index was computed based on the total squared sales value for each segment as a fraction of total firm sales.

vii. Industry effect
The study controls for industry effect and industry diversification. The decision to engage in derivatives by a firm is also influenced by the industry they belong to (Allayannis & Ofek, 2001). If a firm that uses derivatives belongs to a high-Q industry, such as the technology-intensive industry, the firm predictably generates more profit due to the industry itself (Lau, 2016). Therefore, to control for industry effect, the study constructed the industry to the adjusted Tobin's Q and computed the log difference between the weight-adjusted industry Q and multi-segment for each firm (Allayannis & Weston, 2001; Ayturk et al., 2016; Lang & Stulz, 1994).

viii. Investment growth
Firms tend to own a large investment and depend on future investment opportunities to grow. The growth eventually influences firm value. The current study follows Yermack (1996) and Allayannis and Weston (2001) by employing the ratio of capital expenditure to sales as a measurement for investment growth.

3.5. Regression Model

The study examined the significant difference between derivative users and non-users in Shari'ah-compliant firms. The test was performed based on the descriptive analysis and the univariate test of variables. Meanwhile, the study employed a panel regression model to examine whether the user of derivatives performed better than non-users, written as follows:

$$Q_{it} = \beta_0 + \gamma Q_{it-1} + \beta_1 DER_{it} + \beta_2 MO_{it} + \beta_3 LEV_{it} + \beta_4 SIZE_{it} + \beta_5 ACCES_{it} + \beta_6 RISK_{it} + \beta_7 DIV_{it} + \beta_8 EFFECT_{it} + \beta_9 GROWTH_{it} + \eta_i + \varepsilon_{it} \quad \text{Equation 1}$$

Where, Q_{it} is firm performance, measured by Tobin's Q for firm *i* in period *t*. The lagged value of Tobin's Q is included as the independent variable to record the persistence in firm performance, whereas $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$ are the slopes parameter to be estimated. The explanatory variable is DER_{it} (dummy variable that equals to 1 if a firm reports any form of derivatives activities and 0 otherwise). Additionally, the control variables consist of MO_{it} (managerial ownership), LEV_{it} (leverage), $SIZE_{it}$ (firm size), $ACCES_{it}$ (access to financial market), $RISK_{it}$

(firm risk), DIV_{it} (industrial diversification), $EFFECT_{it}$ (industry effect), and $GROWTH_{it}$ (investment growth). Moreover, η_i is an unobserved firm-specific term and ε_{it} is an error term. The study observed a significant positive relationship between derivatives usage and firm performance for H2.

The study employed system-GMM (Generalised Method of Moments) for dynamic panel data (Arellano & Bover, 1995; Blundell & Bond, 1998) to estimate the regression in equation (1). The GMM is effective when exercising the moment conditions in the model framework and the model specified data with a specific number of moment conditions. Panel GMM presents a solution for endogeneity issues in panel data by substituting the endogenous variables with instrumental variables. Moreover, System-GMM offers better elasticity to the variance-covariance framework with greater effectiveness, improves accuracy, and addresses endogenous issues in the model (Baltagi, 2005). The study also performed several diagnostic tests that included instrument validity test and the serial correlation test (Arellano & Bover, 1995; Blundell & Bond, 1998). The Hansen test was employed to check the validity of the instruments used, while AR (1) and AR (2) were applied for the serial correlation tests. The Hansen test presented a null of valid instruments while AR (1) and AR (2) exhibited nulls of the absence of first-order and second-order serial correlation in the residuals, respectively. For AR (1), the null hypothesis should be rejected and the failure to reject the null hypothesis of AR (2) test indicates a robust regression model.

4. EMPIRICAL ANALYSIS AND DISCUSSION

Table 1 presents derivative users and non-users, while Table 2 demonstrates the segregation of the sample firms (users and non-users) based on industries. Table 1 illustrates 177 firms, which are consistently Shari'ah-compliant with 59 derivative users and the remaining 118 non-users. Based on Table 2, industrial products have the highest number of firms (64) and the lowest is the technology industry with five firms.

Table 3 presents the correlation coefficients among the independent variables for derivative users and Table 4 depicts the correlation coefficients for non-users. Tables 3 and 4 illustrate that the multicollinearity issue is not a concern due to low correlation coefficients between the independent variables. Hence, all independent variables are fit to be included in the model.

Table 1: The Selection of Shari'ah-Compliant Firms (2012-2017)

	Year					
	2012	**2013**	**2014**	**2015**	**2016**	**2017**
No. of traded stocks in Bursa Malaysia	923	914	905	901	904	905
No. of Shari'ah-compliant firms	817	653	673	667	672	686
No. of selected Shari'ah-compliant firms	586	586	586	586	586	586
No. of consistent Shari'ah-compliant firms (2012-2017)	177	177	177	177	177	177
User of derivatives	59	59	59	59	59	59
Non-user of derivatives	118	118	118	118	118	118

Table 2: The Segregation of the Selected Shari'ah-Compliant Firms (User and Non-User) Based on Industries

Industry	No. of Shari'ah-compliant firms as of December 2017	No. of consistent Shari'ah-compliant firms (2012-2017)	No. of non-user of derivatives of Shari'ah-compliant firms (2012-2017)	No. of derivatives user of Shari'ah-compliant firms (2012-2017)
Consumer products	105	38	22	16
Industrial products	193	64	42	22
Construction	46	17	14	3
Trading & Services	145	26	18	8
Properties	74	16	15	1
Plantation	32	11	3	8
Technology	75	5	4	1
Total	681	177	118	59

Table 3: Correlation Coefficients among Independent Variables for Derivative users

	Q	MO	LEV	SIZE	ACCESS	RISK	DIV	INDEFFF	GROWTH
Q	1.0000								
MO	-0.1941*	1.0000							
LEV	-0.0141	-0.1266*	1.0000						
SIZE	0.2448*	-0.2170*	0.4830*	1.0000					
ACCESS	0.1894*	-0.1633*	0.0438	0.2541*	1.0000				
RISK	-0.3434*	0.2327*	-0.1833*	-0.5486*	-0.5049*	1.0000			
DIV	-0.0779	-0.0576	0.2965*	0.2870*	0.1343*	-0.1420*	1.0000		
INDEFFF	-0.4776*	0.0046	0.0090	-0.3690*	-0.2210*	0.3610*	0.1050*	1.0000	
GROWTH	0.0498	-0.1190*	0.1443*	0.1362*	-0.0982	-0.0691	0.1305*	-0.0936	1.0000

Note: * represent significance at level $p < 0.05$.

Table 4: Correlation Coefficients among Independent Variables for Non-derivative users

	Q	MO	LEV	SIZE	ACCESS	RISK	DIV	INDEFFF	GROWTH
Q	1.0000								
MO	-0.0756*	1.0000							
LEV	-0.0154	-0.0135	1.0000						
SIZE	0.1986*	0.0304	0.2950*	1.0000					
ACCESS	0.2444*	0.1003*	0.0106	0.4973*	1.0000				
RISK	-0.1440*	-0.0511	-0.0282	-0.3829*	-0.3963*	1.0000			
DIV	0.1086*	-0.0420	0.0280	0.1732*	0.0208	-0.0122	1.0000		
INDEFFF	-0.5509*	-0.0275	-0.2425*	-0.5543*	-0.4390*	0.3194*	-0.0729	1.0000	
GROWTH	0.1065*	0.0757*	0.1086*	0.1978*	-0.0461	-0.0743	0.1509*	-0.1933*	1.0000

Note: * represent significance at level $p < 0.05$.

Table 5 depicts the descriptive statistics and results of the univariate test of the difference, mean and median values of the financial performance, and variables for derivative users and non-users. In terms of performance, Tobin's Q and ROA and ROE, derivative users performed significantly better than the non-users. The study discovered that derivative users exhibited significantly higher firm value (Q) than the non-users by a mean difference of 0.4325 and a median difference of 0.2814 ($p < 0.01$). Moreover, the ROA and ROE confirmed significant differences in performance based on the mean and median between the two firm groups ($p < 0.01$).

The managerial ownership of derivative users and non-users was not significantly different based on the mean but significantly different based on the median ($p < 0.01$). Similarly, in terms of firm risk, industrial diversification and industry effect, non-users were significantly lower than users based on the median ($p < 0.01$). The leverage of derivative users was significantly higher than non-users based on the mean but significantly lower based on the median ($p < 0.01$). Additionally, derivative users were significantly larger in size with better access to financial market and better growth opportunities than non-users with the mean and median ($p < 0.01$).

Table 5: Descriptive Statistic and Univariate Test of Variables

Variables	**Derivative users**			**Non-user of Derivatives**			**Difference**		**Different tests (H_0: User = non-User)**	
	Mean	**SD**	**Median**	**Mean**	**SD**	**Median**	**Mean**	**Median**	**Mean *t*-statistic**	**Median *z*-statistic**
Q	1.1760	1.1082	0.8891	0.7435	0.4937	0.6077	0.4325	0.2814	-8.6544***	-8.941***
ROA	0.0650	0.0569	0.0629	0.0328	0.0697	0.0356	0.0322	0.0273	-7.4692***	-8.250***
ROE	0.1001	0.1247	0.0929	0.0408	0.1411	0.0488	0.0593	0.0441	-6.6269***	-8.801***
MO	0.0799	0.1408	0.018	0.1083	0.1474	0.0451	-0.0284	-0.0271	2.9919	4.248***
LEV	0.2517	0.2830	0.1510	0.1757	0.3894	0.6699	0.076	-0.5189	-3.0027***	-6.478***
SIZE	14.046	1.7517	13.4569	12.7188	1.2466	12.7347	1.3272	0.7222	-14.1565***	-11.711***
ACCESS	0.8220	0.3830	1.000	0.5192	0.4999	0.000	0.3028	1.000	-10.0112***	-9.572***
RISK	0.3004	0.1580	0.2654	0.4317	0.3404	0.3567	-0.1313	-0.0913	6.8930	9.582***
DIV	0.1154	0.0964	0.0897	0.2102	0.2075	0.1029	-0.0948	-0.0132	8.1487	3.509***

Note: * represent significance at level $p < 0.05$.

Table 6 summarises the dynamic panel regression results on the derivatives user and firm performance (Q, ROA and ROE) based on the two-step system GMM. The Hansen test was employed to determine the over-identifying conditions, hence proving that the instrumental variables used were valid and the absence of second-order serial correlation AR (2) in the models. The result fulfilled the standard for validating the GMM estimations.

Derivative users were positively significant ($p < 0.01$) to firm performance (Q). In terms of control variables, the study revealed that managerial ownership, firm leverage, firm size, firm access to the financial market, firm risk, industrial diversification, industry effect, and firm growth were significant in determining firm performance. The estimated coefficient indicated that the use of derivatives contributed 17.9% ($p < 0.01$) higher market value for users (Q). Based on ROA and ROE, the use of derivatives was negatively significant on performance, 1.52% and 2.18% lower than ROA and ROE, respectively ($p < 0.01$). Furthermore, all the control variables in ROA and ROE were statistically significant.

Table 6: Dynamic Panel Regression Results of Derivatives User to Firm Performance

Variables	**Tobin's Q**	**ROA**	**ROE**
Lagged dependent (-1)	0.354***	0.420***	0.479***
	(24.84)	(20.31)	(34.21)
Derivatives User	0.179***	-0.0152***	-0.0218***
	(3.66)	(-3.18)	(-2.92)
Explanatory variables			
Managerial ownership	-0.108***	-0.0021***	-0.0041***
	(-12.85)	(-2.81)	(-3.17)
Firm leverage	-0.309***	-0.0144***	-0.0060*
	(-6.84)	(-3.21)	(-0.61)
Firm size	-0.206***	0.0066***	0.0147***
	(-13.01)	(3.46)	(4.83)
Firm access to financial	0.353***	0.0505***	0.0789***
market	(17.54)	(19.30	(22.06)
Firm risk	-0.0729**	0.0280***	0.0407***
	(-1.98)	(3.95)	(3.49)
Industrial diversification	0.299***	-0.0462***	-0.0785***
	(-3.66)	(-5.07)	(-5.72)
Industry effect	-0.489***	-0.0159***	-0.0187***
	(-22.79)	(-6.78)	(-5.70)
Firm investment growth	0.213***	0.0111***	0.0103**
	(9.46)	(3.65)	(2.27)
Cons	4.086***	-0.0571*	-0.174***
	(15.91)	(-1.94)	(-3.93)
No observation	673	659	658
No of instruments	103	101	103
No of groups	155	155	155
AR (1)	0.059	0.000	0.000
AR (2)	0.332	0.633	0.667
Hansen Test	0.283	0.248	0.255

Note: ***, **, * denote significance at 1%, 5%, 10% level respectively; the numbers in parentheses are the *t*-statistic.

4.1. Regression Results

The hypothesis proposed that derivative users in Shari'ah-compliant firms perform better than non-users. The two-step system GMM results proved that Shari'ah-compliant firms engaged in derivatives performed better than non-users in terms of firm value (Q) ($p < 0.01$). The result is consistent with Allayannis and Weston (2001), Bartram et al. (2011), Nguyen and Liu (2014), and Shen and Hartarska (2013). Therefore, derivatives are effective in reducing firm risk exposure and boosting firm value. Moreover, firms engaged in derivatives were less volatile and less risky than non-user of derivatives. The derivatives user coefficient of 0.179 indicated that derivatives user performed better by 17.9% in performance (Q) compared to non-user. Based on the empirical result, Shari'ah-compliant firms engaged in derivatives performed better than non-users. Hence, the market provides rewards to derivative users through value enhancement from the effective hedging (Mackay & Moeller, 2007; Nguyen & Liu, 2014). Derivatives hedging is employed to protect the business and provide stability to the firms, thus management can employ derivative instruments in risk mitigation (Antônio et al., 2019). Shen and Hartarska (2013) added that risk management through financial derivatives is effective in improving firm profitability and reducing the negative impact of risk. Nevertheless, the study discovered contradictory results based on ROA and ROE

where the derivatives use negatively affected performance ($p < 0.01$), consistent with Ben Khediri (2010), Lau (2016), and Nguyen and Faff (2010b). Lau (2016) proposed that the less liquid derivatives market in Malaysia played a role in the effective use of derivatives among the firms.

Based on performance (Q), the better performance of derivative users compared to non-users was consistent with Stulz's (1984) hedging theory where hedging is value-enhancing. The theory explains that hedging mitigates the impact of uncertainties on firm value and eventually makes them perform better than the firms that do not hedge. Furthermore, the descriptive statistics and univariate test of the study confirmed that derivative users performed significantly better than non-users based on Q, ROA and ROE. Thus, the study proved a significant difference in performance between derivative users and non-users in Shari'ah-compliant firms, thus H1 is supported. Second, Shari'ah-compliant firms engaged in derivatives performed better than the firms that do not use derivatives, hence H2 is supported.

5. CONCLUSION, LIMITATION, AND FUTURE RESEARCH

The study examined the impact of derivatives usage on the performance of Shari'ah-compliant firms in Malaysia. The study provided significant evidence that the user of derivatives in Shari'ah-compliant firms perform better than the non-users, thus reflecting the effective risk management strategies of the firms. The findings filled the literature gap on the risk management strategies of firms in Malaysia in three aspects; first, the current study differs from the previous studies in Malaysia that investigate risk management of firms in general by focusing on Shari'ah-compliant firms. Second, the study offers new insight on the role played by risk management through hedging on firm value in Malaysia. Third, hedging efficiency is vital to ensure that firms fully benefit from their risk management strategies. The results are also robust to the various definitions of firm performance (Tobin's Q, ROA, ROE) and the use of System-GMM estimator to control for endogeneity issue.

Nevertheless, the study limitations include a limited sample to only 59 users of derivatives compared to the 118 non-users of derivatives among Shari'ah-compliant firms. The situation is unavoidable due to the limited number of Malaysian firms engaged in derivatives as highlighted in past literature. The constraint may cause limitation on generalisation of the results and representation of the whole population. Nonetheless, the different effects of hedging on value between the two categories of firms from the Malaysian context provides significant contribution. The analysis can be extended to other countries worldwide that offer Shari'ah and non-Shari'ah-compliant investments. Summarily, the findings provide significant research implications. The study verified that hedging increases firm value based on the hedging theory. Hedging efficiency also ensures that the Shari'ah-compliant firms engaged in derivatives benefit the most out of their risk management strategies.

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