

# Evidence of Predictability Pattern in Shariah based Stocks in KLSE

Nurul Izla Abu Bakar, S Sagarin

Binary University, Malaysia

## **Abstract-** Purpose:

Malaysia played a central role in popularizing Shariah financial system and since then it has played an important role in the development of the economy. But the current focus is on compliance to tenets and it is expected that being compliant also means returns are based on fundamentals rather than speculative. Therefore, the purpose of this paper is to examine whether Shariah based stocks in KLSE have any predictability elements that affects its efficiency.

## Design/Methodology/Approach:

This study demonstrates the use of secondary data to present the stock returns of companies' sample as stated in the KLSE. A two stage analyses have been adopted'; a stochastically based two state Markov chain model for elements of predictability that also captures the speed of transition and if there are predictability elements present an auto-correlation test with multiple lags will be used to identify the repeat cycle. An ANOVA will be undertaken to find the difference in performance of the primary sectors identified as driver of the economy.

## Findings:

The two state Markov chain test results indicate Shariah based stocks have substantial elements of predictability in their future returns on all the three sectors; consumer, construction and industrial products. Furthermore, there is also evidence of serial dependence between the rates of return of share prices at different time periods of the stock market cycle for the three sectors (cyclical patterns observed).

## Research Limitations/Implications:

This study is limited in scope in that it uses the weekly closing prices of the selected companies from three sectors and identified as the key drivers of the economy and not across all sectors. Other issues like market capitalization are not taken into consideration but given equal weightage in the study.

This study negates the prior view that since Shariah stock returns are based on the tenets of Islam it should be non predictable as the speculative elements have been removed and hence its performance ought to be efficient.

## Originality/Value:

The value of this paper lies in the use of a stochastically based test, the Markov chain model that also reflects on speed of convergence of the states; moreover, the use of the secondary data has relevance and offers insight into the predictability patterns in Shariah stocks' performance.

**Index Terms-** Predictability, Shariah stock, KLCE, Markov chain model, Lags

## I. INTRODUCTION

In this section we shall discuss the background, research problem, and significance, statement of research questions and objectives of the study.

### 1.1 Background to the Study:

Equity shares are attractive investment instrument as it generally offer higher returns and are liquid instruments with scope for price appreciation and quick disposal. In terms of market capitalization, equity shares occupy an important position in the local capital market. Over the years the numbers of companies going for public issues and Shariah compliance (Bursa Malaysia, 2015) have increased many folds.

Further, the Malaysian capital market, which includes Islamic capital market, has been highly competitive in the South-East Asian region in attracting quality investment capital. It has been very lucrative to foreign institutional investors who consider investment in the local market as valuable form of investment. The local capital market, contains substantial listing of Shariah compliant companies across different business sectors, is no longer considered a speculative market.

Shariah compliant companies listed in the exchange are companies that have been approved as Shariah compliant by Shariah Advisory Council of Malaysia. The companies are acknowledged with the Shariah principles for its primary business and also its investment activities. The general criteria stipulates that Shariah compliant company must not go against the Islamic principles such as financial services based on riba (interest, excess or surplus over and above the loan capital), gharar (ambiguity/element of deception) and Maisir (gambling). The following core activities are not permitted:

- Gambling
- Manufacture or sale of non-halal products or related products
- Conventional insurance
- Entertainment activities that are non-permissible according to Shariah
- Manufacture or sale of tobacco based products or related products
- Stock broking or share trading in Shariah non-compliant securities
- Other activities deemed non-permissible according to Shariah

In June 1997 the Shariah Advisory Council (SAC) of the Securities Commission (SC) introduced the Shariah compliant securities list in Malaysia. The Council reviews each company's annual financial reports and the specific inquiries made to the

respective company's management before updating the list every May and November.

Since the Shariah compliant securities are part of the securities listed in KLSE Shariah compliant securities, it is therefore not limited to Muslim investors only. For the Muslims who may have interest to trade and invest in the stock market a full-fledged Islamic stock broking company called BIMB Securities Sdn Bhd was set up in 1994 to provide the necessary link.

As at December 2014, there were 673 Shariah compliant companies representing 74.3% of Bursa Malaysia listed companies with a market capitalisation of RM1,012.40 billion representing 61.3% of total market capitalization. At Bursa Malaysia, therefore, choices are abundant as investors have access to an extensive selection of Shariah-compliant stocks across diversified industries for broader and deeper investment portfolios.

### 1.2 Research Problem:

Islamic capital market has seen tremendous growth over the last decade. When the SAC listed the Shariah compliant shares in June 1997, its share was a mere 57% but as of December 2014 it has increased to 74.3% (Bursa Malaysia, 2015).

"Insert Table 1 here"

Based on Shariah criteria sourced from the Quran, the Sunnah, Qiyas, Ijma' and other Shariah principles, Security Commission of SAC has come out with clear Shariah methodology and criteria. They have refined the selection criteria and are innovative in coming out with new products consistency with Islamic principles. Principles such as riba, gharar, maisir are well defined and quantified. This may have enhanced market confidence as the stocks are endorsed by the Shariah body at national level as evidenced by quantitative expansion (Table 1).

Financial markets, however, are increasing in sophistication, constantly changing and competition is increasing, and in order to remain relevant, we need to go beyond compliance to help understand these markets better. The Shariah studies here are more concentrated on compliance, integration and event studies, albeit, with the use of different statistical techniques rather than shed light on the width and depth of financial issues. The purpose of our study, is therefore to fill this gap, in a small way, by finding whether predictable elements exist through the use of probability based test (stochastic modeling) in Shariah compliant companies for an efficient market. We shall focus our attention to the three major sectors identified as drivers of the economy to cover some gaps in understanding this issue.

### 1.3 Significance of the Study:

The Shariah stock can give many benefits as well as to the Islamic country to be the leader and have authority in the market based on Shariah compliance. Malaysia is in good position to be the leader in the market since the country has been involved in Shariah compliance for various industries and over a long period of time.

The interactions among financial, socio-economic and institutional factors in the sense of Islamization can be the strong issues in raising Shariah capital market in the country. A strong tenets being followed in itself may not be sufficient to attract

quality investors but an efficiently run market is paramount in helping towards this endeavor.

This study, therefore, will look at any evidence of predictability patterns across the three industries that have been identified as the driver of the economy the past five years by the Malaysian Government and if there is any evidence then we shall investigate existence of predictable cycle. It is expected that this study will shed some light as to the success of our current system of Shariah compliance and help policy makers to reassess their position and direction from the outcome of this findings.

### 1.4 Statement of the Research Question:

Therefore, our primary aims is to investigate the existence of predictability patterns in Shariah compliant companies in three main sectors; consumers, constructions and industrial, identified as the driver of the economy the last five years and listed in the Bursa Malaysia. And if there are predictable patterns observed we will further study the existence of cyclical patterns. The main question pondered in our research is how predictable are the Shariah compliant stocks of the three main sectors, namely consumers, construction and industrial the last five years that can help better understand the position of Shariah stocks' performance.

### 1.5 Objectives of the Study:

In view of the issues raised, our *primary* objectives will be:

- To investigate the existence of predictability patterns in Shariah compliant companies in the three main sectors independently.
- To investigate the existence of predictability patterns in Shariah compliant companies in the three main sectors combined.

Our *secondary* objectives will be:

- To investigate differences in performance between the three sectors during the test period.
- Finally, if there are predictable patterns, to investigate the predictable cycles in the three sectors.

### 1.6 Limitation of Earlier Studies:

The efficiency performance of Malaysia's Shariah compliant shares has not been studied comprehensively though it is gaining prominence both locally and internationally. Recent studies focused more on Shariah index movements, co integrations and on compliance rather than consistency with sound financial principles. One aspect of sound financial principles involves predictability element of stock returns. No attempt has been made to study predictability of stock returns and efficiency attained through compliance in the local stock market where Shariah stocks form a sizable component. The present study represents an effort to improve on these shortcomings and enrich the literature on Shariah.

In summary, we have reviewed the background, scope and relevance, purpose and need and objective of the study of the study in this section. This was followed by a brief view on the Shariah component of Malaysia stock market focusing on the development and past experience. Lastly, we looked at the limitations of earlier studies. In the next chapter we shall review the various relevant literatures required for the study.

### 1.7 Definition of Key Terms

1. A Markov Chain is a special kind of stochastic process where the outcome of an experiment depends only on the outcome of a previous experiment. In other words the next state of the system depends on the current state and not on the previous states.

2. Eigenvalue 'u'- of a square matrix A is the value  $\lambda_2$  which satisfies the equation  $\text{Det}(A - \lambda I) = 0$  where I is the Unit Matrix.

3. Bull- A market is called bullish when the returns are positive i.e., prices are increasing.

4. Bear- A market is called bearish when the returns are negative i.e., prices are decreasing.

5. Riba - (interest), excess or surplus over and above the loan capital

6. Gharar- ambiguity/elements of deception as in Islamic Principles

7. Maisir- gambling as in Islamic Principles

8. Shariah- Islamic religious law that governs religious rituals and aspects of life of its followers. Shariah, means "the way." There are many variations in how Shariah is interpreted and implemented among and within Muslim societies today. This is especially prevalent for its financial laws

## II. REVIEW OF EMPIRICAL EVIDENCE

In this section various literatures will be reviewed to have an in depth understanding of the Shariah markets' performance in both Malaysia and beyond.

The rapid expansion and popularity of Islamic based investment has placed an added importance to better understand this market. But academic literatures on Islamic stocks are limited in terms of depth and scope as it is in early stages of development. Many of the practices associated with stock trading like speculation, short selling, margin trading, equity futures and options are not well researched and Muslim countries will find myriads of impediments in these endeavor.

The general understanding is that Islamic financial system is better in coping with economic conditions than conventional financial systems as seen in recent economic upheavals (Bakri, Nor Akila, and Mohammad Affendy, 2010). Studies on Shariah compliant equities markets have supported this view. Alam and Rajjaque's (2010) study on three portfolios representing overall market without financial firms and the market of Shariah compliant equities constructed from S&P Europe 350 found the portfolio of Shariah compliant equities outperformed the other two in all analysis. It slightly underperformed when there is an upward growth trend in the economy. This observation is consistent with Shariah compliance in that price, competitive, and profitability differences may accrue from adherence to Islamic principles. Hakim and Rashidian (2010) results show that the total fluctuations in the Dow Jones Islamic Index (DJI) have been in line with other indexes, both broader (the Dow Jones World Index) and restricted (the socially responsible index or "Green"). Their evidence was based on observations (January 00 – Aug 04) which included the prolonged bear market between January 00 and October 02 and the reversal in worldwide equity prices since then. The results indicate a competitive risk adjusted

return and a performance comparable to one of the largest and most comprehensive measures of equity prices available. Their result suggests that Islamic funds expose their clients to similar risk an individual faces in a broad stock market. Similar evidence is also found between Shariah based index (KLSI) and KLCI. Albaity and Ahmad's (2008) study provides one such evidence on the risk and return performance of the Kuala Lumpur Shariah Index (KLSI) and the Kuala Lumpur Composite Index (KLCI). Although KLSI's selection process is based on Islamic laws with more stringent screening process than conventional KLCI, nevertheless the results provide no evidence of significant statistical differences in risk-adjusted returns between Islamic and conventional stock market's daily indices for the period 1999–2005. Their causality and Johansen cointegration tests results to examine short- and long-run relationships found significant short-run presence of bidirectional causality and the long-term equilibrium indicates that both indices move in tandem. They concluded that the movement of KLCI is a good indicator of KLSI both in the short-run and long-run. The market reaction to the introduction of Shariah Index (SI) has been generally positive (Sadeghi, 2008) although some abnormal returns were found immediately prior and after the event day. The researcher attributed this more to presence of increased liquidity risk and asymmetric information cost around the event period.

When a comparison with similar ethical stock but non Shariah compliant is made Shariah complaint underperformed (Hakim and Rashidian, 2010). They reasoned this to the presence of non market-competitive components in the index and an evaluation of their components on a regular basis can help improve the performance of this widely popular index.

However, some sectors performance is not within the norms of Shariah principles. At the property-investment level, there is a belief held by some investors that Shariah compliance leads to a poorer portfolio performance, even though there is no clear consensus view (Ibrahim, Ong, and Parsa, 2006). In addition, a number of experts have pointed out that the current practice of Shariah compliant real estate investment involves a high opportunity cost. This mainly includes the time taken and non standardized process involved in the investment decision making. But this view is not found across all sectors as Hakim and Rashidian (2010) concludes in their research that Islamic index is not suffering a discernible cost for complying with Shariah restriction.

Studies in the Gulf region, especially in MENA region (Morocco, Egypt, Saudi Arabia, United Arab Emirates, Jordan, Kuwait, Qatar and Bahrain) during the period 2005 and 2009 on Shariah compliant firms has indicated no investment value in analysts' recommendations (Omar Farooq, 2014). This is directly opposed to the understanding that the better the information predicting environment due to reduced risk, better the performance.

Ibrahim (2009) study showed long run collective integration through bivariate non-linear relationship of major stocks markets in the region with Bahrain the odd one out. This result is consistent with an earlier study finding of Naeem (2008) who further remarked that Saudi stock market is not the leader though it is the largest in the region. This view is supported by many researchers. Assaf (2003) confirmed integration but with

Bahrain taking the leadership role. Hassan (2003) found long-term link of Kuwait and Bahrain markets in a three stock markets study of Oman, Bahrain and Kuwait. Simon and Evans' (2004) conclude links, both short and long term, among GCC countries. In conclusion, the Shariah markets studies are mostly comparative and compliance to Islamic tenets. The indices based studies show similar trends to conventional markets and exposes investors to no further risk. We shall look further on the issue and study the existence of predictability elements in Shariah stock returns and rather than using index based study, we will look at the contingency of using the weekly data upon earlier findings on the three primary sectors identified as the driver of the economy the last five years. The next chapter will focus on the various mathematical tools that will be used to analysis the data.

### III. RESEARCH METHODOLOGY

#### 2.1 Data, sources of data and period of study:

This study uses secondary data in the form of closing daily prices from a sample of companies that is listed in the Malaysian stock market. Three sectors, consumer, manufacturing and construction, that have been identified as the key drivers of the economy the past five years are selected for the purpose. The weekly price data of companies that are Shariah compliant listed in the Main Board of KLSE is obtained from the websites of the respective financial suppliers. The time period the data was collected is from January 2010 to January 2015.

#### 2.2 Sampling Technique:

A total of 436 companies listed in the three sectors are chosen as the population for the study. For the consumer products out of 134 companies listed, 79.10% are Shariah compliant, Industrial products sector out of 260 listed, 70% are compliant and Construction sector out of 42 listed, 83.33% are Shariah compliant. For a fair representation of the three Shariah sectors, the proportion of Shariah compliant is calculated for each sector based on the above proportions. A sampling size of 54 Shariah listed companies is selected. The total sample size is distributed across the three sectors based on the proportion of Shariah compliance. Individual companies are selected using a simple random sampling technique from each sector.

The closing weekly prices are recorded as data for analysis. No specific adjustments are made for Issue of Bonus Shares, Issue of Rights Shares and Payment of Cash Dividend as they are insignificant and not regularly practiced. The size of market capitalization is not taken into consideration. Investors invest in variable income securities in anticipation of future expected returns. They expect their investments to earn a return that will compensate for the time, expected rate of inflation and the uncertainty associated with the investments. In case of investments in shares, the return consists of the dividend income and the capital appreciation. In Malaysia generally the trend is that the dividend income is very low among majority of the equity shares issued and therefore the investors do not give much weightage to the amount of dividend on their holdings (Shimomoto, 2000). Many studies have also confirmed that the corporate dividend policy does not affect the market price of the shares. Hence in the current study takes only the capital

appreciation/depreciation into account. Investors are more concerned with the share price fluctuations, as it is the fluctuations in the market price which will give considerable return on their investment. The daily return on the share price is computed.

#### 2.3 Data Analysis Technique:

*A two stage analyses will be undertaken; predictability through the use of Markov Chain Model and if there is evidence of predictability a test of Autocorrelation will be used.*

#### A. Markov Chain Model

Transition Probability Matrix, with two states, 0 (for bear- run) and 1 (bull- run), can be given as:

$$P = \begin{bmatrix} a & 1-a \\ 1-b & b \end{bmatrix}$$

where  $a = \{ P(X_{t+1} = 0 / X_t = 0) \}$  and  $b = \{ P(X_{t+1} = 1 / X_t = 0) \}$

The steady state probability  $\pi_j$  denotes the limiting probability that the system will be in each state  $j$  after a large number of transitions, and that this probability is independent of the initial state.

$\lim_{n \rightarrow \infty} p_{ij}^n = \pi_j > 0$ , where the  $\pi_j$  is uniquely satisfy the following steady state equations.

$$\pi_j = \sum_{i=0}^M \pi_i P_{ij}, \text{ for } j = 0, 1, \dots, M. \quad \text{where } \sum_{i=0}^M \pi_j = 1$$

The  $\pi_j$  are called the steady state probabilities of the Markov Chain.

We further define a set of random variables,

$$Y_n = \begin{cases} 0, & \text{if return} < 0, \\ 1, & \text{if return} > 0 \end{cases} \quad (1)$$

$$R_t = \frac{I_t - I_{t-1}}{I_{t-1}}$$

where Return (R) is defined as  $\frac{I_t - I_{t-1}}{I_{t-1}}$  over two time period  $t$  and  $t-1$

Assuming that  $(Y_n)$  follows a stationarity first order Markov chain and future movement of  $(Y_n)$  depends only on its current state.

Then the transition matrix of  $(Y_n)$  will be:

$$P = \begin{bmatrix} p_{11} & p_{12} \\ p_{21} & p_{22} \end{bmatrix} \quad 0 < P_{ij} < 1,$$

$$\text{where } P_{i1} + P_{i2} = 1 \text{ for } i = 1, 2; j = 1, 2 \quad (2)$$

The unique state probability vector is:  $\pi (\pi_1 + \pi_2) = 1, 0 < \pi_1 < 1, \pi_1 + \pi_2 = 1,$  (3)  
 And leads to the Equation;  $\pi P = \pi$ .

Further, let the limiting steady state matrix of P be  $\Pi$  where,

$$\Pi = \lim_{n \rightarrow \infty} P^n = \begin{bmatrix} \pi_1 & \pi_2 \\ \pi_1 & \pi_2 \end{bmatrix}$$

And if successive returns are independent then the conditional distributions of  $Y_n$  will not depend on their past values, implying both the rows of P will be equal to  $\Pi$ . A high gap between P and  $\Pi$  is therefore, an indicator of lack of efficiency. For perfectly efficient markets, the bull and bear states would be distributed over time in such a manner that the knowledge of the state of current return will not lead to a gain in prediction because  $p_{11}$  and  $p_{22}$  would be equal in magnitude and both will be equal to  $\Pi$ .

Since  $P^n$  converges to  $\Pi$  as n tends to infinity a possible measure of efficiency could be based on the speed with which P converges to  $\Pi$ .

Speed is related to  $|p_{11} - p_{21}| = 0$ , the second highest eigenvalue of P is  $\lambda_2$ , which is also denoted as u.  
 $\lambda_2 = p_{11} + p_{21} - 1$   
 (4)

(Implying  $\lambda_2 = p_{11} + p_{22} - 1 = |p_{11} - p_{21}| = u$ ). u can be used as a measure of relative efficiency. For perfectly efficient markets  $p_{11} = p_{21}$  implying  $u = 0$ . The critical region of the test does not depend on the steady state probabilities. However it depends on the number of observations in the chain.

### B. Test of Autocorrelation

The test of autocorrelation deals with the dependency between numbers in a sequence. The test helps to find out whether the stock price changes are correlated overtime. When autocorrelation is done on a series of values separated by regular intervals (share returns), the result is highly significant, if there is serial dependence between values. If the result is insignificant it proves that there is no serial dependence between the tested values, showing the time series is random. If the computed autocorrelation value is lower than, three times the standard error, the relationship is insignificant and vice versa. In this study auto correlation is done on the time series returns of shares.

$$R_t = \frac{I_t - I_{t-1}}{I_{t-1}}$$

(1)  
 (Where  $R_t$  is the return today,  $I_t$  and  $I_{t-1}$  are closing values of share prices/Index value today and yesterday respectively) Using the returns (data/X), over time interval (t) we can find the covariance ( $C_1$ ) between  $X_t$  and  $X_{t+1}$ . It can be calculated from the equation given below.

$$C_1 = \left( \frac{1}{N} \sum_{t=1}^{N-1} (X_t - \mu_x)(X_{t+1} - \mu_x) \right)$$

(2)

(Where N is the number of observations,  $X_t$  is today's return;  $\mu_x$  is the average of returns and  $X_{t+1}$  is the next day's return)

As the resultant value measures the covariance between successive observations, it is called auto-covariance. We can similarly find the auto co-variance between observations that are separated by a distance k, denoted as  $C_k$ . It is derived as,

$$C_k = \frac{1}{N} \sum_{t=1}^{N-k} (X_t - \mu_x)(X_{t+k} - \mu_x)$$

(3)

(Where, k- lag,  $C_k$  -auto covariance, autocorrelation  $R_k$  of the order k -  $\frac{C_k}{C_0}$ , where  $C_0$  is the variance of the observations) (Brockwell and Davis, 2002)

Our interest lies in the serial relationship of the series. To test the existence of serial relationship of the stock market's return, we can test whether the time series returns from the market are completely random. For a completely random time series, for large N,  $R_k$  is approximately equal to 0 for all non-zero values of k.

We can test whether  $R_k$  is statistically significant with the help of normal distribution properties. If calculated value  $R_k$  is greater than  $(3 \times 1/\sqrt{N})$  times (standard error) or is  $R_k$  less than  $(-3 \times 1/\sqrt{N})$  times (standard error) then we can reject the null hypothesis that  $R_k$  is equal to zero with 99% confidence.

Research Hypothesis:

Based on the literature review, diverse approaches are been applied to understand stock price movement, we will select one among the many, the Markov chain model, rarely used in the local context, and test it on the stock price returns. This approach, leads to similar conclusion like other statistical tools but has the added advantages of focusing on speed of convergence of price movement and is stochastic in nature.

i. Two state Markov model is used to test the efficiency of

$$R_t = \frac{I_t - I_{t-1}}{I_{t-1}}$$

the monthly return ( ) on the share price over the testing period. For this the following hypothesis are formulated for Markov model.

$H_{01}$ :  $\lambda_2 = 0$ , that is Knowledge of the state of current returns will not lead to gains in prediction of future returns of most of Shariah based stocks of the three sectors; consumer, construction and industrial products (not dependent).

$H_{a1}$ :  $\lambda_2 \neq 0$ , that is Knowledge of the state of current returns will lead to gains in prediction of future returns of most of Shariah based stocks of the three sectors; consumer, construction and industrial products (dependent).

$H_{02}$ : Knowledge of the state of current returns will not lead to gains in prediction of future returns of most of Shariah based stocks of the three sectors; consumer, construction and industrial products combined (not dependent).

$H_{02}$ : Knowledge of the state of current returns will lead to gains in prediction of future returns of most of Shariah based stocks of the three sectors; consumer, construction and industrial products combined (dependent).

ii. An ANOVA test is undertaken to test whether there is significant difference in performance of mean returns of three sectors. For this the following hypothesis is formulated.

$H_{03}$ : There is no difference in performance of the three sectors; consumers, construction and industrial products over the test time period (performance in tandem).

$H_{a3}$ : There is difference in performance of the three sectors; consumers, construction and industrial products over the test time period (performance not in tandem).

iii. Auto Correlation test using 1,2, 3 and 4 Lags will be

$$R_t = \frac{I_t - I_{t-1}}{I_{t-1}}$$

used on the monthly return on the share price over the testing period. For this the following hypothesis is formulated for Auto Correlation.

$H_{04}$ :  $R_k = 0$ , There is no serial dependence between the rate of returns of share prices at different time periods of the stock market cycle for the three sectors (cyclical patterns not observed).

$H_{a4}$ :  $R_k \neq 0$ , There is serial dependence between the rate of returns of share prices at different time periods of the stock market cycle for the three sectors (cyclical patterns observed).

## Data Analysis

### 4.1 Summary of Performance:

#### i. Consumer Products

"Insert Table 2 here"

Of the 18 companies, 8 (44.4%) show negative returns and 10 (55.6%) show a small positive returns over the test period.

#### ii. Industrial Products

"Insert Table 3 here"

Of the 30 companies, 12 (40%) show negative returns and 18 (60%) show a small positive returns over the test period.

#### iii. Construction

"Insert Table 4 here"

Of the 6 companies, 1 (16.7%) shows negative return and 5 (83.3%) show a small positive returns over the test period.

### 4.2 Differences in Performance:

An ANOVA test was undertaken to test whether there is significant difference in performance of mean returns of three sectors.

"Insert Table 5 here"

An F-test value of 0.048113 is obtained and is compared to a critical F-value of 3.178799. Based on the test result there is no significant differences in their mean returns of the three sectors at the 5% level of significance.

### 4.3 Data Analysis-Markov Test results:

"Insert Table 6 here"

Based on the Markov test on consumer products, the number of eigenvalue significantly different from zero based on the 95% and 99% level of confidence is 88.9%.

"Insert Table 7 here"

Based on the Markov test on consumer products, the number of eigenvalue significantly different from zero based on the 95% and 99% level of confidence is ninety five percent.

"Insert Table 8 here"

Based on the Markov test on consumer products, the number of eigenvalue significantly different from zero based on the 95% level of confidence is 100%.

Summary of Performance based on Markov Test.

"Insert Table 9 here"

Based on the Markov test on the three industries in isolation and collectively, more companies are significantly different from zero.

### 4.4 Data Analysis-Auto Correlation Test results:

"Insert Table 10 here"

The autocorrelation coefficients are computed for time lags of 1,2,3,4, for each of the companies in the three sectors. The calculated coefficients show significant differences for lag 1 indicate dependence among successive price changes.

#### Interpretation of Results

1. Since the % of non significant lambdas ( $\lambda_2$ ) are significantly low across all three sectors, we do not accept the null hypothesis  $H_{01}$ .

That is knowledge of the state of current returns will not lead to gains in prediction of future returns of most of Shariah based stocks of the three sectors; consumer, construction and industrial products (not dependent) is rejected.

2. Since the % of non significant lambdas ( $\lambda_2$ ) are significantly low across all three sectors combined, we do not accept  $H_{02}$ .

That is knowledge of the state of current returns will not lead to gains in prediction of future returns of most of Shariah based stocks of the three sectors; consumer, construction and industrial products combined (not dependent) is rejected.

3. Based on the F-test result there is no significant differences in their mean returns of the three sectors, therefore we do not reject  $H_{03}$ .

There is no difference in performance of the three sectors; consumers, construction and industrial products over the test time period (performance in tandem).

4. Overall, only lag 1 is significant and all other lags exhibit non significance. The Shariah compliant companies of the three industries show dependence at lag 1.

Therefore we reject  $H_{04}$  for lag 1 and conclude that there is significant serial dependence between the rate of returns of share prices at different time periods of the stock market cycle for the three sectors (cyclical patterns not observed) at lag 1 (monthly cycle).

## IV. SUMMARY OF FINDINGS

The findings from the analyses done in the above section are summarized below.

#### Test of Market Predictability:

A two state Markov chain model for discretized returns uses the modulus of the second highest Eigenvalue ( $u$ ) of the

transition matrix of the chain as a measure for market predictability. The findings show that for majority of the Shariah shares, the Eigenvalues are found to be significant, confirming that the successive share price returns are non independent confirming prediction possibility. It can be inferred that the Shariah based stocks' performance is non efficient during the five years period.

#### *Test on performance between sectors returns:*

The ANOVA tests results indicate no difference in performance among the three sectors.

#### *Test on share price behavior:*

Autocorrelation test is used to check the serial correlation of Shariah based stocks. The test shows statistically significant values for majority of shares at Lag 1, indicating dependent behavior of successive share price changes.

#### *Implication:*

This study points to some clear view in the current scenario of Shariah compliant stocks. It negates the prior view on Shariah compliant companies' performance (based on the tenets of prohibition of gharar) is more efficient and therefore non predictable. It appears more and more companies are opting for listing under Shariah compliance for market expansion and this is aided by the current system of compliance measure.

#### *Discussion:*

The Shariah body's endorsement of stocks at national level is expected to enhance confidence in the market not only in terms of compliance but also performance. But test results prove otherwise. It appears compliance has encouraged quantitative expansion without the need to look at sound financial principles. There is ample evidence from test results on predictability behavior of stock returns for Shariah based stocks, and therefore, less confidence on the part of investors. Various reasons are identified; skewed government support and the advisory body's current focus on Shariah compliance and not going beyond, discrimination by investors and companies benefiting from broader market base rather positioning on sound financial principles.

Unless these issues are investigated and remedial actions taken Malaysia's view on market confidence will remain in perception only and its ambitious of being the market leader being not fulfilled.

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#### AUTHORS

**First Author:** Nurul Izla Abu Bakar, MSc (Finance) Binary University Malaysia, E-mail: [nurul\\_abakar@yahoo.com](mailto:nurul_abakar@yahoo.com)  
**Second and Correspondence Author:** S Sagarar, PhD, Binary University Malaysia, [gssagarar@hotmail.com](mailto:gssagarar@hotmail.com)

**Appendix**

**Table 1: Market Capitalization of Islamic Equities**

Year	M-cap of Islamic Equities (RM billion)	% of M-cap Islamic Equities
2001	303.2	65.2
2002	290.5	60.3
2003	383.9	59.9
2004	448.2	62.1
2005	439.8	63.3
2006	548.4	64.6
2007	705.1	63.7
2008	426.4	64.2
2013	1029.62	71.4
2014	1012.14	74.3

Source: Securities Commission Malaysia, 2015

**Table 2: Mean Price and Return for Consumer Products**

Consumer Products Company	Mean Price	Mean Return
Ajinomoto (M) Bhd	4.4832	-0.0016
APEX HEALTHCARE BHD	3.4073	-0.0016
Apollo Food Holdings Bhd	3.6577	-0.0013
Asia File Corporation Bhd	4.5907	-0.0005
CAB Cakaran Corporation Bhd	0.4624	-0.0023
Caely Holdings Bhd	0.3207	0.0012
CCM Duopharma Biotech Bhd	2.4698	-0.0003
Classic Scenic Bhd	0.9346	-0.0033
Cocoaland Holdings Bhd	2.1148	0.0000
Cycle & Carriage Bintang Bhd	3.3303	0.0033
D.B.E. Gurney Resources Bhd	0.1102	0.0121
DPS Resources Bhd	0.1177	0.0069
Dutch Lady Milk Industries Bhd	32.8798	-0.0048
EKA Noodles Bhd	0.2899	0.0093
Ekowood International Bhd	0.2336	0.0055
Emico Holdings Bhd	0.2305	0.0043
Eng Kah Corporation Bhd	2.8361	0.0009
Euro Holdings Bhd	0.3646	0.0023

**Table 3: Mean Price and Return for Industrial Products**

Industrial Products Company	Mean Price	Mean Return
Abric Bhd	0.3215	0.0003
Acme Holdings Bhd	0.7383	0.0090
Adventa Bhd	1.6437	0.0144



Ajiya Bhd	1.9429	-0.0003
Aluminium Company Malaysia Bhd	0.8182	0.0020
Ancom Bhd	0.4412	0.0023
APB Resources	1.0130	0.0013
APM Automotive Holdings Bhd	5.0653	-0.0014
Astino Bhd	0.8923	0.0014
Astral Supreme Bhd10	0.1984	0.0069
B.I.G. Industries Bhd	0.3863	0.0039
Boon Koon Group Bhd	0.2171	0.0046
BP Plastics Holdings Bhd	0.6519	-0.0013
Cahaya Mata Sarawak Bhd	2.0642	-0.0042
Can-one Bhd	2.0330	-0.0023
Chin Well Holdings Bhd	1.2952	-0.0009
Choo Bee Metal Industries Bhd	1.6157	0.0008
CME Group Bhd	0.0655	0.0044
Coastal Contracts Bhd19	2.7552	0.0008
CSC Steel Holdings Bhd	1.4129	0.0016
Cymao Holdings Bhd	0.4568	0.0036
Daibochi Plastic Ans Packaging Industry bhd	3.2472	-0.0014
Delloyd Ventures Bhd	3.5253	-0.0024
Denko Industrial Corporation Bhd	0.2506	0.0006
Dominant Enterprise Bhd	0.8108	-0.0021
DRB-Hicom Bhd	2.1335	-0.0010
Eksons Corporation Bhd	1.1183	-0.0011
Eonmetall Group Bhd	0.3582	0.0032
Evergreen Fibreboard Bhd	0.9101	0.0029
FACB Industries Incorporated Bhd30	0.8254	-0.0008

**Table 4: Mean Price and Return for Construction Company**

Construction Company	Mean Price	Mean Return
Bina Darulaman Bhd	1.3370	0.0026
Crest Builder Holdings Bhd	1.0117	-0.0009
Ekovest Bhd	1.8962	0.0024
Fajarbaru Builder Group Bhd	0.8139	0.0040
Gadang Holdings Bhd	0.9079	0.0002
Ho Hup Construction Company Bhd	0.8858	0.0038

**Table 5: ANOVA test result for the three Sectors**

ANOVA							
Source	of						
Variation	SS	df	MS	F	P-value	F crit	
Between Groups	0.000001	2.000000	0.000001	0.048113	0.953069	3.178799	
Within Groups	0.000779	51.000000	0.000015				

Total 0.000781 53.000000

**Table 6: Markov test results for Consumer Products**

Consumer Products Company	eigenvalue $\lambda_2(u)$	95% CI	99% CI
Ajinomoto (M) Bhd	-0.13028	S	S
APEX HEALTHCARE BHD	0.06133	S	S
Apollo Food Holdings Bhd	0.09421	S	S
Asia File Corporation BHD	0.10929	S	S
CAB Cakaran Corporation Bhd	-0.17162	S	S
Caely Holdings Bhd	-0.17448	S	S
CCM Duopharma Biotech Bhd	-0.17342	S	S
Classic Scenic Bhd	0.01305	S	S
Cocoaland Holdings Bhd	-0.09683	S	S
Cycle & Carriage Bintang Bhd	-0.08551	S	S
D.B.E. Gurney Resources Bhd	-0.08148	S	S
DPS Resources Bhd	-0.13780	S	S
Dutch Lady Milk Industries Bhd	0.03247	S	S
EKA Noodles Bhd	-0.00200	NS	NS
Ekowood International Bhd	-0.07919	S	S
Emico Holdings Bhd	-0.04055	S	S
Eng Kah Corporation Bhd	-0.00182	NS	NS
Euro Holdings Bhd	-0.09429	S	S

**Table 7: Markov test results for Industrial Products**

Industrial Products Company	eigenvalue $\lambda_2(u)$	95% CI	99% CI
Abric Bhd	-0.11416	S	S
Acme Holdings Bhd	-0.05287	S	S
Adventa Bhd	-0.07497	S	S
Ajiya Bhd	-0.16585	S	S
Aluminium Company Malaysia Bhd	-0.07587	S	S
Ancom Bhd	-0.06263	S	S
APB Resources	-0.11801	S	S
APM Automotive Holdings Bhd	-0.03996	S	S
Astino Bhd	-0.18247	S	S
Astral Supreme Bhd	-0.10681	S	S
B.I.G. Industries Bhd	-0.01987	S	S
Boon Koon Group Bhd	-0.04055	S	S
BP Plastics Holdings Bhd	-0.11375	S	S
Cahaya Mata Sarawak Bhd	-0.03044	S	S
Can-one Bhd	-0.01187	S	Ns
Chin Well Holdings Bhd	-0.14594	S	S
Choo Bee Metal Industries Bhd	-0.12350	S	S

CME Group Bhd	-0.03266	S	S
Coastal Contracts Bhd	-0.11041	S	S
CSC Steel Holdings Bhd	0.02954	S	S
Cymao Holdings Bhd	-0.09035	S	S
Daibochi Plastic Ans Packaging Industry Bhd	0.01318	S	S
Delloyd Ventures Bhd	0.00392	NS	NS
Denko Industrial Corporation Bhd	-0.15973	S	S
Dominant Enterprise Bhd	-0.11318	S	S
DRB-Hicom Bhd	0.02548	S	S
Eksons Corporation Bhd	-0.08927	S	S
Eonmetall Group Bhd	-0.19692	S	S
Evergreen Fibreboard Bhd	-0.02234	S	S
FACB Industries Incorporated Bhd	-0.11017	S	S

**Table 8: Markov test results for Construction Company**

Construction Company	eigenvalue $\lambda_2(u)$	95% CI	99% CI
Bina Darulaman Bhd	-0.03252	S	S
Crest Builder Holdings Bhd	-0.01519	S	S
Ekovest Bhd	-0.11786	S	S
Fajarbaru Builder Group Bhd	-0.02190	S	S
Gadang Holdings Bhd	-0.07999	S	S
Ho Hup Construction Company Bhd	0.07339	S	S

**Table 9: Markov test results for three Sectors**

	%. of non sig (ns), $\lambda_2^{\wedge} = 0$	%. of sig , $\lambda_2^{\wedge} \neq 0$
Consumer Product	2 (11.1%)	16 (88.9%)
Industrial Product	2 (6.7%)	28 (93.3%)
Construction	0 (0%)	5 (100%)
Across 3 sectors	4 (7.5%)	49 (92.5%)

**Table 10: Auto correlation test at Lag 1,2,3 for three Sectors**

S. No.	Lags	Shariah compliant No.	% Significance
1	1	All three Industries (Consumers Product, Industry Product, Construction)	70.33
2	2	All three Industries (Consumers Product, Industry Product, Construction)	10.16
3	3	All three Industries (Consumers Product, Industry Product, Construction)	6.50

		Industry Construction	Product,	
4	4	All three (Consumers Industry Construction	Industries Product, Product,	8.13