Research in Management of Technology and Business Vol. 1 No. 1 (2020) 866–876
© Universiti Tun Hussein Onn Malaysia Publisher's Office

RMTB

Homepage: http://penerbit.uthm.edu.my/periodicals/index.php/rmbt
e-ISSN : 2773-5044

Stock-Bond Nexus: The Case of Malaysia

Nuraznezan Pargan[1] & Siti Aisyah Mustafa[2*]

[1]Department of Technology Management, Faculty of Technology Management and Business,
Universiti Tun Hussein Onn Malaysia, Parit Raja, 86400 Batu Pahat, MALAYSIA

[2]Department of Business Management, Faculty of Technology Management and Business,
Universiti Tun Hussein Onn Malaysia, Parit Raja, 86400 Batu Pahat, MALAYSIA

*Corresponding Author Designation

DOI: https://doi.org/10.30880/rmtb.2020.01.01.065
Received 30 September 2020; Accepted 01 November 2020; Available online 01 December 2020

Abstract: The dynamic behavior of stock and bond market movements over time has called for an appraisal of knowing their nexus. The increasing role of these two market segments in the Malaysian economy amplifies the need for such information. Hence, in this study, we examine the causality linkage between in daily observations of stock index and bond yield movements in the Malaysian market. A cointegration method, namely autoregressive distributed lag (ARDL) model is employed to investigate both the short-run and long-run causality on a set of daily stock price index and 10-year government bond yield from the period spanning 2008 to 2018. The findings of the study indicated that the model variables have no long-run and short-run interactions, but the causality test result suggests that FBMKLCI causes MGS 10-year yield in this study which is uni-directional.

Keywords: Stocks, Bond Yields, ARDL, Causality

1. Introduction

We have seen a remarkable development in global economy compared to four or fifty years ago. There was a claim that such transformation hinged crucially on the role of financial sector, of which capital market posits a vital position as one of the sub segments. This is in line with what had been evident in the literature, whereby an appreciation of finance-economic growth nexus has long gained traction in financial economics field, first pioneered by Schumpeter (1911). He pointed out that development of financial system will spur economic growth by way of allocating capital, managing risks as well as technological innovation. In particular, the capital market, which consists of the stock and bond market, play an essential part in mobilising and allocation of surplus and shortage of funds and subsequently led to economic prosperity (Unkoro & Uko, 2013).

*Corresponding author: aisyahm@uthm.edu.my

In Malaysia, along with the significant shift in the amount of funds raised from equity and debt market, where the amount of capital rose from equity and debt market as at end of 2015 was equal to MYR188 billion compared to MYR13.86 billion in 1990, our economy has grown together, reflected by positive GDP growth year to year, thousands of job creations[1], rising income as well as poverty alleviation. This positive news is predictable, given various initiatives had been taken place by both the participants in the financial industry and regulators to ensure market is operated seamlessly, in efficient manner and eventually able to influence the economic growth positively.

1.1 Research Background

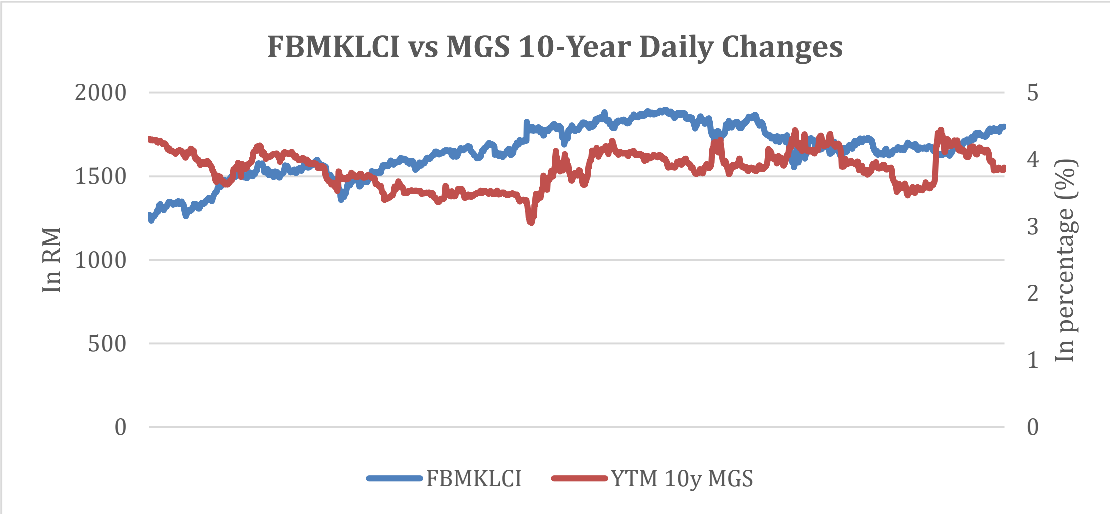

Figure 1: Daily changes of FBMKLCI and MGS 10-year

In the past ten years (see Figure 1), the trend of stock price (presented by FBMKLCI) and bond yields (presented by MGS 10-year) have showed different fluctuation patterns in their daily changes, especially after the subprime debt crisis 2008. Apparently, the degree of price gaps for stocks has been relatively greater than yields due to its aggressive trading momentum, making its interday (or even intraday) prices to heavily fluctuate. Bond yields, on the other hand, were traded less aggressively. Although the peaks and troughs in both markets unpredictability are not synchronous, bond yields are now becoming more volatile alongside stock. Since Malaysia practices an open economy, the impact of the worldwide recession was felt strongly especially in the import-export related sectors. However, the versatility of domestic demand, especially the private utilisation, offered support to the economy, keeping it from contracting in the final quarter of 2008. In the mid of 2016 and 2017, the stock price showed a downward movement while the bond market is going upward, indicating a decoupling trend.

Johansson (2010) stated that during the phase of market chaos, the relationship between stock and bond market would be negative. On the opposite, the stock and bond tend to positively correlated during economic expansion (Patoda & Jain, 2012), due to the increasing discount rate may prompt to the price for both assets decreasing. Understanding such nexus, is important for the portfolio managers to make investment decision.

1.2 Problem Statement

Understanding causality relationship between stock index and bond yield performance is an important element in managing risk and for asset allocation (Goyenko & Ukhov, 2009). Such information helps asset managers in constructing a diversified portfolio and gauging risk sentiment

[1] The government agency, PEMANDU, reported that 45, 000 job opportunities were created by the financial sectors.

across markets they invested in. However, the direction of risky assets and a risk-free asset is unstable and keep changing over time, making their relationship to interweave to each other dynamically. This behavior often has been associated with varying conditions of macroeconomic factors such as changes in inflation, unemployment rate, monetary policy stance and industrial production. Examples of past studies that provide empirical support on the role of macroeconomic news on the dynamics of the stock-bond relationship are Yang *et al.* (2009), Liu *et al.* (2015), Ahmad *et al.* (2015) and Ohmi & Okimoto (2016), to name a few.

Therefore, this paper attempts to investigate the presence of a linkage between stock and bond market in the aftermath of the crisis period 2008. In particular, we would like to analyse which proxies, if the stock-bond relationship exists in the case of the current sample used, are sensitive towards each other. If the nexus is equity leading, we know that bond market performance is heavily reliant on changes in the stock market and vice versa.

1.3 Research Questions

(i) Is there any relationship between these markets' performance (stock and bond market)?
(ii) What is the direction of such a relationship?

1.4 Research Objectives

(i) To examine the relationship between stock and bond markets.
(ii) To analyse the direction of such relationship between stock and bond markets.

1.5 Significance of the Study

This study is a pioneer study undertaking empirical investigation on the dynamic behavior of stock and bond market on the Malaysian context, evaluated through changes in broad composite index prices (FBMKLCI) and MGS 10 year yields. Fluctuations in asset prices (stock and bonds) require investors or portfolio managers to frequently re-balancing their investment portfolio. This de-wealth and re-wealth effects not only affect consumption expenditures, which account substantial portion of GDP, but also results in underfunding and excess-funding by businesses. Besides, by understanding the nexus of these two markets, investors can be more sensitive in realising the potential risks of their investments. Accordingly, with this information, they will be better informed on the likelihood of repercussions stemming from different economic events. In fact, policymakers will also be fully furnished with more recent information detailing linkages among variables used to help stabilise the market. This, can facilitate them to formulate more effective stabilising policies.

1.6 Scope of the Study

The study was conducted on the Malaysian context, and for stock market, the study utilizes daily changes of broad market index rather firm-specific stock information, whereas MGS 10-year yields are utilized to represent the bond market performance. Besides, to capture the post-effect of global financial crisis 2008, only data available for a ten year period (2008-2018) are considered.

2. Literature Review

Especially in the aspect of behavioral finance, the interactions of stock and bonds have received considerable attention among researchers, especially after the global financial crisis hit the market in 2008. This is due to the fact that market volatilities during the crisis period were relatively high. In this section, we present some of the existing studies that focused on the subject matter.

Taking 11 Eurozone countries as a sample size with the time period length started during the second quarter 1996 and the second quarter 2016, Skintzi (2019) studied on the dynamic relationship between stock-bond returns. Data of stock market indices and 10-year government bonds are used to represent the movements of stock and bond market obtained from *Datastream*. The findings of the studies demonstrated that interactions of both markets, while have shown a considerable change over time, became more apparent during market turmoil and the recent sovereign debt crisis.

Bayraci *et al.* (2018) examined the interactions between changes in stock returns as well as 10-year government bond yields trend in G7 countries. Based on the wavelet squared coherence approach, the dynamics of such interactions both in time and frequency domain are obtained. Daily data of stock indices and bond yields from the period of 2002 and 2014 were used. The results give strong support of positive co-movements, which vary over time and across investment horizon. They further analyse the dynamic nature of the scale-dependent wavelet correlations and find that the correlations are highly volatile and significantly increase across different time scales during the episodes of the equity market turbulence. In terms of flight to quality, the increase in correlations reflects flights from stocks to safer bond investment as a result of dramatic changes in investor sentiment and risk aversion at times of market stress.

Tokpayi & Boucher (2018) claimed that bond yield movement at different yield environments can give impact to the strength of relationship between stocks and bonds. Based on the set of weekly data focusing on U.S market, where government bond yield is used a proxy to indicate bond market and the S&P 500 stock index, over the period 30 years (up until 2017), the study showed that when the strength of flight-to-safety from stocks to bonds decreases the strength of flight-to-safety from stocks to gold increases. This result is more pronounced in the current low-yield environment, suggesting a shift in the historical attractiveness of bonds as a safe haven.

Shahzad et al (2017) explore the causal links between U.S. industry-wise credits and stock markets by using weekly data of CDS market index representing all industries along with the S&P 500 stock index for the period 14th December 2007 to 31 December 2014. They use Granger causality test as the method of this study. The findings show that there is bidirectional causality for the banking, healthcare and material industries and also found that CDS-stock causality relationship has bidirectional causalities between the credit and stock markets that vary over different sub-samples.

Another study that focuses on finding the relationship between daily changes in the Treasury yields and stock index returns is Jammazi *et al.*, (2017). Focusing on the country-specific analysis, United States, and by relying on Granger causality test and multifactor smooth transition approaches, they found that there was a significant bidirectional causal relationship on the time length used (from 1993 to end of year 2014), primarily due to the strong concurrent linkages between the stock returns and bond yields. In particular, the interaction is stronger in the aftermath of the subprime crisis 2008.

Naifar & Hammoudeh (2016) investigates the dependence structure between major local Sukuk (Islamic bonds) yields in three Muslim countries (Malaysia, United Arab Emirates and Saudi Arabia) and various stock market conditions as represented by national, regional and global stock market returns and conditional volatility. They use daily data for both yield-to-maturity for Sukuk and stock market index from 23rd November 2010 until 6th October 2014. The variables used for Islamic bonds are Sukuk for the three of the largest Sukuk market in the world and stock market index for Malaysia, UAE and Saudi Arabia are FBMKLCI, Abu Dhabi Securities Market General Index (ADSMI), and Tawadul All-Share Index (TASI) respectively. They use the Archimedean copula models as their method of this study. The results show that the three largest country Sukuk indices exhibit significant dependence but only with the volatility of the considered stock markets. In this study also find that the country Sukuk yields are more sensitive to the global conventional stock market rather than to the global Islamic, regional and local stock markets.

Similar to Skintzi (2019) in terms of sample size, Dajcman (2015) also examined the co-movements between changes in sovereign bond yields and stock market return for the Eurozone countries (Austria, Belgium, Finland, France, Ireland, Italy, Germany, Netherlands, Portugal and Spain). Stock returns and government bond yields of different time frames (depending on its availability) were used. Using the maximal overlap discrete wavelet transform variance and correlation methods, he drew the following results; first, the correlation of both markets is mostly positive except Portugal; second, stock return appeared to fluctuate heavily than bond yields. The statistical evidence against the hypothesis of no multiscale dependence yet is weak. Thus, they cannot statistically claim that the wavelet coefficients at higher scales are significantly different (either higher or lower) that those at lower scales.

From the above studies, we noticed that the outcomes drawn from these empirical studies are almost similar, where their co-movements tend to be positive and stock-leading. Undoubtedly, prior studies using cross sectional data offer crucial insights on dynamic interactions between stock and bond relationships in the respective countries studied, but since study on country-specific, particularly on the Malaysian context, are almost untapped thus far, which, if they are specifically addressed, could produce different findings is of relevance. Therefore, this study aims to address the above limitations by examining the stock-bond nexus in the context of Malaysian capital market.

3. Research Methodology

3.1 Cointegration test

This study employs auto-regressive distributed lag (ARDL) model, a co-integration model developed by Pesaran (1997) to examine the long run relation among the series: manufacturing sector and financial development, due to several advantages. First, it can be applied irrespective of whether the series are I(0), I(1), or fractionally cointegrated. Second, it provides robust results for smaller sample size properties, hence, suitable for the current study since our sample is small. Third, error correction method integrates the short-run dynamics from the long-run equilibrium, without losing long-run relationships information (Tiwari *et al.*, 2013; Pesaran *et al.*, 2001). The ARDL baseline models in this study can be presented as follows:

$$\textit{Model 1: } FBMKLCI_t = \alpha + \beta MGS + e_t$$

$$\textit{Model 2: } MGS_t = \alpha + \beta FBMKLCI + e_t$$

All data are expressed in natural logarithm form. The ARDL-bounds testing model in this study can be expressed as follows:

$$\Delta \mathrm{lnFBMKLCI}_t = P_0 + \sum_{i=1}^{n} \phi_{1i}\, \Delta \mathrm{lnFBMKLCI}_{t-i} + \sum_{i=0}^{n} \phi_{2i}\, \Delta \mathrm{lnMGS}_{t-i} + \phi_5 \mathrm{lnFBMKLCI}_{t-1} + \phi_6 \mathrm{lnMGS}_{t-1} + e_t$$

$$\Delta \mathrm{lnMGS}_t = P_0 + \sum_{i=1}^{n} \phi_{1i}\, \Delta \mathrm{lnMGS}_{t-i} + \sum_{i=0}^{n} \phi_{2i}\, \Delta \mathrm{lnFBMKLCI}_{t-i} + \phi_5 \mathrm{lnMGS}_{t-1} + \phi_6 \mathrm{lnFBMKLCI}_{t-1} + e_t$$

Where *p* is the optimal lag length for dependent variable, *q* is the optimal lag length for exogenous variables (regressors), Δ is first difference operator (if integration order is I(1), $\mathrm{lnFBMKLCI}_t$ is natural log of broad market index, and lnMGS_t is natural log of MGS 10-year, and e_t denotes error terms.

Whereas for the short-run coefficients (if long-run cointegration exists from the Equation 1), the ARDL specification takes the following form:

$$\Delta \mathrm{lnFBMKLCI}_t = P_0 + \sum_{i=1}^{n} \phi_{1i}\, \Delta \mathrm{lnFBMKLCI}_{t-i} + \sum_{i=0}^{n} \phi_{2i}\, \Delta \mathrm{lnMGS}_{t-i} + \phi_3 \mathrm{lnFBMKLCI}_{t-1} + \phi_4 \mathrm{lnMGS}_{t-1} + \mathrm{ECT}_{t}\text{-}1 + e_t$$

$$\Delta \ln MGS_t = P_0 + \sum_{i=1}^{n} \phi_{1i}\, \Delta \ln MGS_{t-i} + \sum_{i=0}^{n} \phi_{2i}\, \Delta \ln FBMKLCI_{t-i} + \phi_3 \ln MGS_{t-1} + \phi_4 \ln FBMKLCI_{t-1} + ECT_{t\text{-}}1 + e_t$$

Where:

ECT_{t-1} is lagged error correction term obtained from the long run equilibrium relationship

3.2 Causality Test

If variables are cointegrated, causality relationship should be investigated within a dynamic error correction (Engle & Granger, 1987) as shown in equation below. The test of long run causality is examined through the significance of cointegrating equation of the lagged error correction term, meanwhile short run causality test is done through the joint significance of the lagged differences of the explanatory variables. To confirm on the short run causality, we also will employ Granger causality test for the model. Selection of optimal lag is critical in the analysis mentioned above and this study will adopt most commonly used lag order selection criteria of Akaike Information Criterion (AFC) and Final Prediction Error (FPE). The smallest possible lag length as denoted by both order criteria will be taken for the analysis. Stability diagnostic tests of CUSUM and CUSUM of squares will be employed to check the model goodness of fit.

$$\Delta FBMKLCI_{\mathrm{t}} = \alpha_1 + \sum_{i=1}^{m} \emptyset_{\mathrm{i}} FBMKLCI_{\mathrm{t-i}} + \sum_{\mathrm{j}=0}^{n} \beta_j \Delta EC_{t-j} + \Psi_1 ECT_{t-j} + \xi_{1t}$$

$$\Delta EC_{\mathrm{t}} = \alpha_2 + \sum_{i=1}^{m} \varphi_{\mathrm{i}} FBMKLCI_{\mathrm{t-i}} + \sum_{\mathrm{j}=0}^{n} \theta_j \Delta EC_{t-j} + \Psi_2 ECT_{t-j} + \xi_{2t}$$

3.3 Data Collection

The variables that we used in this study are FBMKLCI as a proxy for stock market obtained from *The Wall Street Journal* and MGS 10-year yields as a proxy for bond market sourced from *Bank Negara Malaysia*. To capture the post-effect of global financial crisis 2008, only data available for a ten year period spanning from year 2008 until 2018 are considered in this study.

a) FBMKLCI - is a benchmark index that comprises of the largest 30 companies by full market capitalization on Bursa Malaysia's Main Board. A historical stock market performance is given by the market index for the yardstick to measure the performance of asset managers' portfolios. Furthermore, it enables investors to conjecture future trends in the market (Naik & Phadi, 2012).
b) MGS 10-year yield - MGS are long-term bonds issued by the Government of Malaysia for financing developmental expenditure. In the literature, the 10-year government bond yield is commonly used variable as it conveys information about the future information on the state of economy, thereby will affect the investment decisions directly (Bayraci, Demiralay & Gencer, 2018).

4. Data Analysis and Results

A total of 4018 daily prices of FBMKLCI and MGS 10-Year yield were studied for 10 years period between January 2008 and December 2018. The statistics showed that the index had a positive return on FBMKLCI of about 1608.676 per day while MGS 10-Year yield about 3.919216. The skewness coefficient for FMBLKCI is -1.479192 indicated that the distribution was negatively skewed, which was a common return feature of equity returns. For MGS 10-Year yield is 0.080433 which indicate that the distribution was positively skewed. For standard deviation, FBMKLCI has 233.5594 and MGS 10-

Year yield has 0.304112. The kurtosis coefficient which measures of thickness of the tails of the distribution was calculated to be 4.646801 for FBMKLCI and 3.865226 for MGS 10-Year yield.

Table 1: Descriptive statistics

	FBMKLCI	**MGS 10-Year Yield**
Mean	1608.676	3.919216
Median	1673.050	3.940000
Maximum	1895.180	5.040000
Minimum	829.4100	2.970000
Standard Deviation	233.5594	0.304112
Skewness	-1.479192	0.080433
Kurtosis	4.646801	3.865226
Jarque-Bera	1919.264	129.6632
Probability	0.000000	0.00000
Sum	6463659	15747.41
Sum Sq. Dev.	219000000	371.5076
Observations	4018	4018

To examine the time series characteristics of the model variables, the Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) unit root tests were conducted. The results suggest both variables became stationary after first-differencing I(1). The results of both tests, as reported in Table 2:

Table 2: Unit root test

Variable	**ADF**		**PP**		**Stationary status**	
	Level	First difference	Level	First difference	ADF	PP
LNFBM KLCI	-1.3615	-58.2602	-1.3417	-58.2690	I(0)	I(1)
LNMGS	-3.3162	-63.0498	-3.7662	-63.3826	I(0)	I(1)

The lag length criteria most optimal based on Final Prediction Error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ) suggested the 2 lags as lag order to be used in this study. The results are shown in the Table 3, as follows:

Table 3: Selection of lag length

Lag	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	NA	0.239899	1.410342	1.411911	1.410898
1	34729.95	0.00	-7.249995	-7.246856	-7.248883
2	27.54688*	0.00*	-7.256368*	-7.251656*	-7.254699*
3	0.020860	0.00	-7.255875	-7.249597	-7.253650
4	0.002161	0.00	-7.255377	-7.247529	-7.252595
5	0.102371	0.00	-7.254904	-7.245486	-7.251566
6	0.743837	0.00	-7.254591	-7.243604	-7.250697

Note: *indicates lag order selected by each criterion

Table 4: Bounds test – Model 1 (FBMKLCI)

Lag	NPL model, F = 4.359114

	Critical bounds (k=1)	
Level of significance	I(0)	I(1)
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

Table 5 presents at 10%, F-statistics (4.359114) is inconclusive because it falls between the upper bound (4.78) and lower bound (4.04) for FBMKLCI. For MGS 10-Year yield, at 1% the F-statistics (7.519583) is inconclusive because it also falls in between upper bound (7.84) and lower bound (6.84).

Table 5: Bounds test – Model 2 (MGS-10 year yield)

Lag	NPL model, F = 7.519583	
	Critical bounds (k=1)	
Level of significance	I(0)	I(1)
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

The probability FBMKLCI and MGS 10-Year yield in Table 6 are 0.9498 and 0.0804 respectively shows that there is no long-run relationship because the probability in the long-run relationship has to less than 0.05.

Table 6: Long-run relationship

Model	Variable	Coefficient	t-statistics	Prob.
1	LNFBMKLCI	-0.007634	-0.062934	0.9498
2	LNMGS	-3.009959	-1.721327	0.0804

The short-run causation is reflected through the F-statistics under the coefficient of the variables. The results of the short-run relationship between FBMKLCI and MGS 10-Year yield for both models are presented in Table 7. CointEq(01) is negative with an associated coefficient estimate of -0.001175. This implies that about -0.1175% of any movement into disequilibrium are corrected for within one period. Moreover, given the very large t-statistic, namely -2.953033, we can also conclude that the coefficient is highly significant. Same goes to Model 2 which the CointEq(01) is also negative with value -0.006410 (-0.6410%) with t-statistics -3.878521.

Table 7: Short-run relationship

Model	Variable	Coefficient	t-statistics
Model 1	C	0.013514	2.960449
	D (LNFBMKLCI (-1))	0.081623	5.196345
	D (LNMGS)	-0.036696	-2.938831

Model 2	CointEq (01)*	-0.001175	-2.953033
	C	0.009099	3.873976
	D (LNMGS (-1))	0.005380	0.341468
	D (LNMGS (-2))	0.040105	2.546862
	D (LNFBMKLCI)	-0.060020	-3.029364

Pairwise Granger causality test conducted to confirm the ECM results for FBMKLCI and MGS 10-Year yield. Table 8 showed the results of Granger causality test. The probability less than 0.05 it mentions that the null hypothesis is accepted. Therefore, FBMKLCI causes MGS 10-Year yield in this study which uni-directional, inversely. The results of Granger causality test is shown in Table 8. The probability of less than 0.05 means that the null hypothesis is accepted. Therefore, FBMKLCI causes MGS 10-Year yield in this study which uni-directional.

Table 8: Granger causality test

Null hypothesis	**Obs**	**F-statistic**	**Prob**
LNMGS does not Granger Cause LNFBMKLCI	4081	3.26009	0.0385
LNFBMKLCI does not Granger Cause LNMGS	4081	0.83263	0.4350

Lastly, to ascertain for structural stability of the model, the cumulative sum of recursive residuals (CUSUM) test of FBMKLCI and MGS 10-Year yield is employed in Figure 2 and Figure 3, respectively. This follows the suggestion by Pesaran and Shin (1998). The results for the model show that all the plots of the CUSUM statistics is within the critical bounds of the 5% significance level. Therefore, the null hypothesis, which states that all the coefficients in the regressions are stable, cannot be rejected

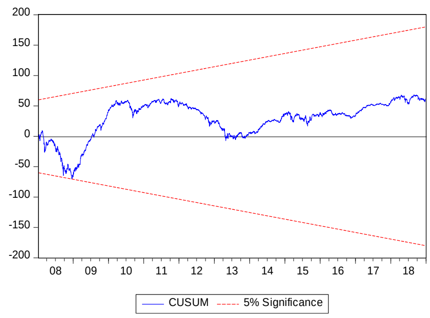

Figure 2: CUSUM Test Model 1

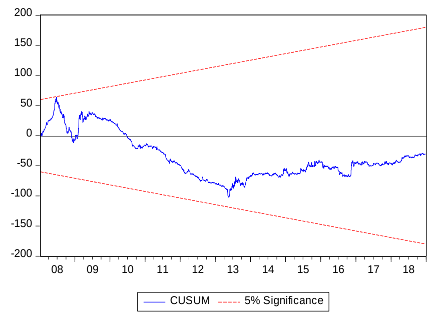

Figure 3: CUSUM Test Model 2

5. Discussion and Conclusion

This study is conducted to examine the presence and direction of the relationship between FBMKLCI and MGS 10-year yield. The variables of the daily data was extracted from 2008 until 2018 through *The Wall Street Journals* and *Bank Negara Malaysia*. To reach at the findings, we employ Autoregressive Distribution Lag (ARDL) to test their cointegration and Granger causality test is to examine the causality between FBMKLCI and MGS 10-year yield. In order to analyze the robustness of the study, CUSUM test was used to check the stability of the data. After we employed the tests, the results found that there is no cointegration and no long-run relationship between the variables. This state that the stocks are not running in parallel with bonds in the long run. In the short-run results also show that there is no relationship between FBMKLCI and MGS 10-year yield. However, Granger Causality test analyzed that FBMKCLI causes MGS 10-year yields in this study which uni-directional.

Acknowledgement

The authors would like to thank the Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia for its support.

References

Ahmad, A. U., Abdullah, A., Sulong, Z., & Abdullahi, A. T. (2015). Causal relationship between stock market returns and macroeconomic variables in Nigeria. *Journal of Humanities and Social Science*, *20*(5), 74-96.

Bayraci, S., Demiralay, S., & Gencer, H. G. (2018). Stock-Bond Co-Movements and Flight-To-Quality in G7 Countries: A Time-Frequency Analysis. *Bulletin of Economic Research*, *70*(1), E29-E49.

Dajcman, S. (2015). An empirical investigation of the nexus between sovereign bond yields and stock market returns–a multiscale approach. *Engineering Economics*, *26*(2), 108-117.

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, 251-276.

Evrim-Mandaci, P., Kahyaoglu, H., & Cagli, E. C. (2011). Stock and bond market interactions with two regime shifts: evidence from Turkey. *Applied Financial Economics*, 21(18), 1355-1368.

Goyenko, R. Y., & Ukhov, A. D. (2009). Stock and bond market liquidity: A long-run empirical analysis. *Journal of Financial and Quantitative Analysis*, *44*(1), 189-212.

Jammazi, R., Ferrer, R., Jareño, F., & Hammoudeh, S. M. (2017). Main driving factors of the interest rate-stock market Granger causality. *International Review of Financial Analysis*, 52, 260-280.

Johansson, A. C. (2010). Stock and bond relationships in Asia. *Stockholm School of Economics, Stockholm*.

Liu, L., & Zhang, T. (2015). Economic policy uncertainty and stock market volatility. *Finance Research Letters*, *15*, 99-105.

Naik, P. K., & Padhi, P. (2012). Interaction of Macroeconomic Factors and Stock Market Index: Empirical Evidence from Indian Data. *Available at SSRN 2150208*.

Ohmi, H., & Okimoto, T. (2016). Trends in stock-bond correlations. *Applied Economics*, *48*(6), 536-552.

Ong, S. L., & Ho, C. M. (2014). Testing for Linear and Non-Linear Granger Non-Causality Hypothesis between Stock and Bond: The Cases of Malaysia and Singapore. *The Singapore Economic Review*, 59(05), 1450045.

Patoda, R., & Jain, K. (2012). Assimilation between bond market and stock market. *Global Journal of Management and Business Research*, *12*(20).

Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association*, *94*(446), 621-634.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289-326

Shahzad, S. J. H., Aloui, C., Jammazi, R., & Shahbaz, M. (2019). Are Islamic bonds a good safe haven for stocks? Implications for portfolio management in a time-varying regime-switching copula framework. *Applied Economics*, 51(3), 219-238.

Shahzad, S. J. H., Nor, S. M., Hammoudeh, S., & Shahbaz, M. (2017). Directional and bidirectional causality between US industry credit and stock markets and their determinants. *International Review of Economics & Finance*, 47, 46-61.

Schumpeter, J. (1911). The theory of economic development. *Harvard Economic Studies*. Vol. XLVI.

Skintzi, V. D. (2019). Determinants of stock-bond market comovement in the Eurozone under model uncertainty. *International Review of Financial Analysis*, *61*, 20-28.

Tokpavi, S., & Boucher, C. (2018). *Stocks and Bonds: Flight-to-Safety for Ever?* (No. 2018-39). University of Paris Nanterre, EconomiX.

Yang, J., Zhou, Y., & Wang, Z. (2009). The stock–bond correlation and macroeconomic conditions: One and a half centuries of evidence. *Journal of Banking & Finance*, *33*(4), 670-680.