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Flight-to-Quality between Stock and Bond Markets: Pre and Post Global Financial Crisis

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Abstract

The Global financial crisis (GFC) that originated in U.S has resulted in the collapse of many large financial institutions. Due to that, it had caused the downturn in U.S stock market and many other countries. Daily return of stock market in United States decrease to negative levels while volatility levels surged up to 200%. Malaysia was not an exception that received an impact where stock market suffered large losses during crisis. KLCI fall below its benchmarks, which is below 1000 points. While stock market experience high volatility during crisis, bond market is one investment alternative for investors to shift from risky asset to reduce risk of loss. In this case, investors should shift their investment from stock to bond to reduce risk of loss during crisis. This behaviour is called flight-to-quality. Flight-to-quality refers to a sudden shift in investment behaviours in a period of economic crisis. Thus, this paper is conducted with the objectives to analyze the existence of flight from stock to bond (FTQ); There are three data set which employed; before crisis, during crisis and after crisis. The daily stock indices and bond indices are collected from January 2006 until December 2014. This study will use event study which is a method to assess the impact of an event on the value of a stock and bond. The findings also indicate that investor's flight to corporate bond Islamic and corporate bond conventional during global financial crisis. Corporate bond Islamic is a preferred bond investment follow by corporate bond conventional.

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1. Background of Study

Global financial crisis has adversely affected the world's economy and in particular the banking industry among many other industry. The Global financial crisis (GFC) originated in U.S, has resulted in the collapse of many large financial institutions. Due to that, it had caused a global scale downturn in stock market around the world. Daily return of stock market in United States decrease to negative levels while volatility levels surged up to 200% (Chaudhury 2011). Malaysia was not an exception that received an impact where securities suffered large losses during crisis (Angabini and Wasiuzzaman 2011). The global financial crisis 2008 affected and showed a downward trend of stock market in Malaysia. The KLCI index starts to decrease from 1445.03 points in December 2007 to 872.55 points in March 2009 and this comes around -39.62% drop in its index value. According to Bank Negara annual report 2009, Malaysia economy was affected by global financial crisis during third quarter of 2008 until first quarter of 2009. Due to that, that KLCI in a downward trend and fall below its benchmark 1000 point, from October 2008 until March 2009. Based on the table, it shows Malaysia stock market had received huge impact on the global financial crisis when KLCI fall below 1000 point, and the lowest index was during October 2008, with index 863.63 point. In this case, investors from stock market should find an investment alternative to reduce risk of loss.

According to Ahmed (2009), the strategic allocations of among broadly defined asset classes is stock and bond, which can be the most critical decision determining investment performance and financial success. The Global Financial Crisis has been described as the toughest challenges to the world economy. According to Chong (2011), the bankruptcy of Lehman Brothers was the fourth largest U.S investment bank turned out to be another big crash cause by the mortgage crisis leading a deep fall on stock market price. Malaysia was not an exception that receives the impact. It can be observed that in 2008, the performance of stock market in Malaysia in term of trading value showed a dramatically decrease from US$169.72 billion to US$93.78 billion (Yeoh and Hooy, 2010). That was the biggest decline after Asian financial crisis in year 1998. This paper highlights the issue of investors' shift in behaviour towards from risky to safer investment during crisis. This behaviour is called flight to quality. Flight-to-quality can be defined as investors shift from risky asset like stock towards safe asset like bond. According to Baur and Lucey(2009), flight-to-quality from stocks to bond as a decrease in the correlation coefficient and simultaneously falling stock market. In other word, when stock-bond correlations are positive during pre-crisis, and turn to negative during crisis, there is flight to quality. However, Bordo et.al (2001), describes the phenomenon of flight-to-quality encourages investor to diversify across asset classes. Based on the others finding of Peng et.al (2011), Baur and Lucey 2009, Mardi Dungey et.al 2009, Guler and Ozlale 2005, Durand et.al 2010) in various countries, investors tends to shift from risky asset to safer asset in a period of financial turmoil. The investors move out from asset with high expected risk, such as stock, and shift to the assets with low risk such as bond. During Global Financial Crisis 2007/2008, Kuala Lumpur Composite Index(KLCI) dropped around 670 points within the period from January 2008 until September 2008 and this comes to around a 45% drop in its value (Angabini and Wasiuzzaman 2011). Based on the above scenario, this study suspect investors in stock market will affected during this time. The investors will shift their investment from stock to another classes of assets to minimise their risk by avoiding uncertainty. Based on this argument, this paper analysed the existence of flight to quality by investigating the stock market performance in Malaysia.

2. Previous studies

According to Baur and Lucey (2009), they defined flight-to-quality from stocks to bond as a significant decrease in the correlation in a (stock market) crisis period compared to a benchmark period resulting in a negative correlation level. If the pre-crisis stock and bond correlation are positive, and become negative during crisis period, there is flight-to-quality. In this study, they had examined the existence of flight from stock to bonds and vice versa. Investor seeks the less risk investment during market phenomenon. According to Prendergast (2009) states those flight-to-quality episodes often in the context of financial crisis. He defined a flight-to-quality to be sudden increases in investor risk aversion with regard to uncertainty in future cash flows, typically evidenced by prices of less risky securities rising relative to prices of riskier securities. Its differ with Durand et.al (2010)

who had examine the flight-to-quality effect by using copula-based analysis. In this study, they had analyzed the relationship between equity and long-term bond returns. At the end of the study, they found that in the normal course of events, the discounting story describes the relationship between returns of bonds and the value-weighted index. In rare cases, falling equity prices are associated with -increasing bond prices as predicted by the flight-to-quality story.Guler and Ozlale (2005) had done a study to investigated the relationship between inflation uncertainty and interest rates for safe assets. In this study they had employ a time-varying parameter model with GARCH specification. The result supports the existence of a flight-to-quality effect. They found that an increase in uncertainty, which could also be viewed as a rise in economy-wide risk, might generate a flight-to-quality effect and decrease their interest rate. Financial crises are also strongly associated to flight-to-quality events. (Caballero and Krishnamurthy 2008) present a model in which Knightian uncertainty induces investors to flee risky claims in favour of safe ones as they cover themselves against worst-case scenarios.According to Durand, Junker and Szimayer (2010) have pointed the existence of flight to quality. When investors fly to quality they move out of assets with higher expected risk, such as equities and increase demand for less risky assets such as bond. By using copula analysis for equity and bond from 1952 to 2003, they found that flight quality effect where negative equity return associated with large positive bond return. Bordo et al. (2001) in their study describes the phenomenon of flight to quality encourages investors to diversify across assets classes. They believe cross market linkages have led to increasing the probability of financial contagion during crisis period.

Meanwhile. Peng, Yong and Treepongkaruna (2011), investigates the existence of flight to quality phenomena during crisis period in the stock and bond market of APEC countries between 1995 and 2010. By using daily stock return and bond return for 14 countries from APEC countries across eight crisis periods between 1995 until 2010. The result show flight to quality to occurs from stock market to the U.S. government bond market during the crises. However during the Asian Crisis and Global Financial Crisis, investor withdrew their funds from stock market due to market crashes and invested in the bond market for secured return in the almost the APEC countries. The study by Tamara and Hutagaol (2012) reported that flight to liquidity more often than flight to quality between stock and bond in Indonesia market. It is due to Indonesia stock bond market less depending on the develop market growth. Gonzalo and Olmo (2005) reveal that financial markets are interdependent. They found the evidence that have substitute effect between Dow Jones Corporate Bond Index with Dow Jones Stock Index when one of them is through distress period.The present financial crisis, which has been dubbed the worst, has not only affected the United States banking system, but all over the world. According to Sukmana and Kholid (2009), Stock market crash around the world during the crisis period demonstrated the financial contagion of recent Global Financial Crisis (GFC). Not with standing, the financial crisis firstly hit stock markets in the United States and other developed market; it soon spread around the world to hit stock markets in emerging country like Indonesia and other Southeast Asia countries. Same with Angabini and Wasiuzzaman (2011) who agreed that GFC had given an impact all over the world. In his studied, it showed that Kuala Lumpur Composite Index drop around 670 points this comes to around a 45% drop in its value. Because of the crisis, there was an increase in the impact of news about volatility from the previous period.

Salina H. Kassim, Majid, and Hamid (2011) said, as for Malaysia, the sub-prime crisis has had significant impact not only on the real sector, but also the financial sector. This calls for a deeper investigation on the economic and financial crisis on the Malaysian financial sector so that pre-emptive measures can be undertaken if history were to repeat itself in the future. A specific segment of Malaysia's financial sector that has close link with that of the USA is the stock market.Barsky(1989) begin his article with a quote from Chicago Federal Reserve Letter, stating that investors tends to look for safety asset when they feel unsecured with current economic condition. They will adjust their portfolios to include safer and fewer risky assets like from stock to bond. In his studied, he had explores the relationship between stock and bond in the consumption-based asset pricing model. Besides that, he analyses the effect of changes in risk and economic productivity growth and their impact towards stock and bond joint behaviour. At the end of the studied, he concludes that stock and bond may or may not move together and the result is depending on economic agents 'general level of risk aversion.

3. Variables and Method of Analysis

The data set consists of daily Malaysia Stock Exchange Composite Index, Malaysia Government Bond Index, Government Investment Issue Index, Islamic Corporate Bond Index and Conventional Corporate Bond Index issue from January 2006 until December 2014. A daily data is chosen because high frequency data is more preferable to see the sensitivity between stock index and bond index. These types of bond have been choosing because of their performance and the largest contribution towards Bank Negara Malaysia (BNM). According to Bank Negara report, Malaysia bond market has largely been achieved through exception growth of the corporate bond market (Islamic and conventional). Malaysia's well developed government bond market is complemented by a sizeable corporate bond market. This paper will use event study which is a method to assess the impact of an event on the value of a stock and bond. Mackinlay (1997) design the time frame for an event study for accounting and finance, management, economics, marketing, information technology, law, and political science. In this study, there are three data set with different economic environment which is pre-crisis, crisis and post-crisis. Figure 1 illustrates the time frame for this study.

$\tau = T1\ to\ T2$ as the event window.
$\tau = T0\ to\ T1$ as the estimation window.
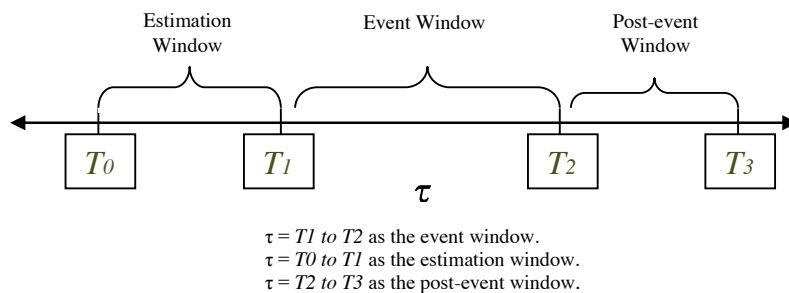$\tau = T2\ to\ T3$ as the post-event window.

Figure 1. Diagrams for Event Study Period

Data analysis starts with test the stationary. The stationary process is a stochastic process whose joint probability distribution does not change when shifted in time or space. Consequently, parameters such as the mean and variance, if they exist, also do not change over time or position. Stationary is used as a tool in time series analysis, where the raw data are often transformed to become stationary. The second step is to test the volatility for bond and stock by using ARCH/GARCH. After look the volatility of the stock and bond, the final step is the test the correlation between the stock and bond. By testing the correlation between stock and bonds, can answer the objective of this study.

4. Findings and Discussion

4.1 Test of Stationary for Stock and Bond

Table 1. Augmented Dickey-Fuller (ADF) Test: Stock and Bond

Series	ADF t-test	ADF t-test	Order of Integration
Pre –Crisis :KLCI	0.5494*	0.0000**	I (1)
:MGS	0.5682*	0.0000**	I (1)
:GII	0.5472*	0.0000**	I (1)
:CC	0.4842*	0.0000**	I (1)
:CI	0.5350*	0.0000**	I (1)

Crisis: KLCI	0.3406*	0.0000**	I (1)
:MGS	0.7501*	0.0000**	I (1)
:GII	0.7739*	0.0000**	I (1)
:CC	0.9174*	0.0000**	I (1)
:CI	0.8928*	0.0000**	I (1)
Post-Crisis: KLCI	0.0843*	0.0000**	I (1)
:MGS	0.9996*	0.0000**	I (1)
:GII	0.9999*	0.0000**	I (1)
:CC	0.9929*	0.0000**	I (1)
:CI	0.9897*	0.0000**	I (1)

* Augmented Dickey-Fuller (ADF) test by using Trend-Stationary Process (TSP) to test the stationary of the data series at level;
  Intercept; Lag = 0
**Augmented Dickey-Fuller (ADF) test by using Trend-Stationary Process (TSP) to test the stationary of the data series at 1 different;
  Intercept; Lag = 0

The process of unit root test start by using "Level, "Intercept" and "Lag differences =0 .Table 1 above shows the result of unit root for KLCI, MGS, GII, CC and CI by using "Level, "Intercept" and "Lag differences =0". For pre-crisis, crisis and post-crisis data series, the p-value of KLCI, MGS, GII, CC and CI are more than 0.05. Then, test for KLCI, MGS, GII, CC and CI with "1st Different", "Intercept" and "Lagged Differences= 0". For pre-crisis, crisi and post-crisis result, the p-value of KLCI, MGS, GII, CC and CI are 0.000 which less than 0.05 mean this study fail to reject the null hypothesis. All the times series data are stationary at first different.

4.2 Volatility Linkage between Stock and Bond

Table 2. Estimation of ARCH/GARCH for Stock and Bond: Crisis Period

Variables	KLCI & MGS		KLCI & GII		KLCI & CC		KLCI & CI	
	Variance Equation		Variance Equation		Variance Equation		Variance Equation	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	0.050543	0.0000	0.063313	0.0000	0.040832	0.0022	0.037062	0.0024
RESID(-1)^2	0.411853	0.0026	0.468251	0.0005	0.475888	0.0034	0.506036	0.0011
GARCH(-1)	0.071721	0.5179	0.098605	0.3385	0.405347	0.0013	0.413685	0.0005

The findings show that p-value for KLCI & MGS, KLCI & GII are less than 0.05. The p-value for KLCI & MGS for GARCH Model is 0.5179 which is more than 0.05. The same result are report for KLCI & GII which is 0.098605 which also more than 0.05. Both result are discussed before indicates that coefficients are not significant at the 5% level. Therefore, the volatility of the stock market is not explained for MGS and GII. The next Estimation of ARCH and GARCH for stock and Bond table observed the volatility for the corporate bond which is included corporate bond conventional and Islamic. This table illustrates that p-value for KLCI & CC and KLCI & CI are less than 0.05. However, it is interesting to highlight that the KLCI & CC is 0.0013 and KLCI & CI is 0.0005 which both are significantly at the 5% level. The findings have shown that during the crisis period there have volatility linkages between stock market towards bond market which only consist of corporate conventional and Islamic. Based on the all the volatility result above, it can be concluded that, stock market have volatility linkages towards bond market which only affected on the corporate bond. The volatility in stock market may causes investors to worry about the risk which impact on their investment return.

4.3 Time –Varying Correlation between Stock and Bond

By looking the time varying stock-bond correlations with the dynamic conditional correlation estimator (DCC) of Engle (2002) with the objective to assess the evolution of stock-bond correlation through time. Figure 2 and 3 illustrates the time varying correlation for KLCI & MGS and KLCI & GII. There is significant degree of dispersion for KLCI & MGS and KLCI & GII. The result shows the trend line fluctuate consistently for the whole sample period. For KLCI & MGS, most of the correlations reach the positive correlation with maximum value 0.45 during crisis period. Same goes with KLCI & GII, the correlation was at maximum level with value 0.65. However, the dispersion of the correlation for KLCI & CC and KLCI & CI (Figure 4 and Figure 5). It shows that the correlation for KLCI&CC reach a minimum level with value -0.35 during crisis period while -0.4 minimum level for KLCI&CI. The overall trend line was at a negative level and only a few days of observations were in a positive level. As a conclusion, based on dynamic conditional correlation estimator (DCC) figure, it can indicates that the dispersion and volatility of correlation of KLCI & CC and KLCI & CI are very clear show the range of volatile for the entire sample period. It can address on the correlation between KLCI & CC and KLCI & CI.
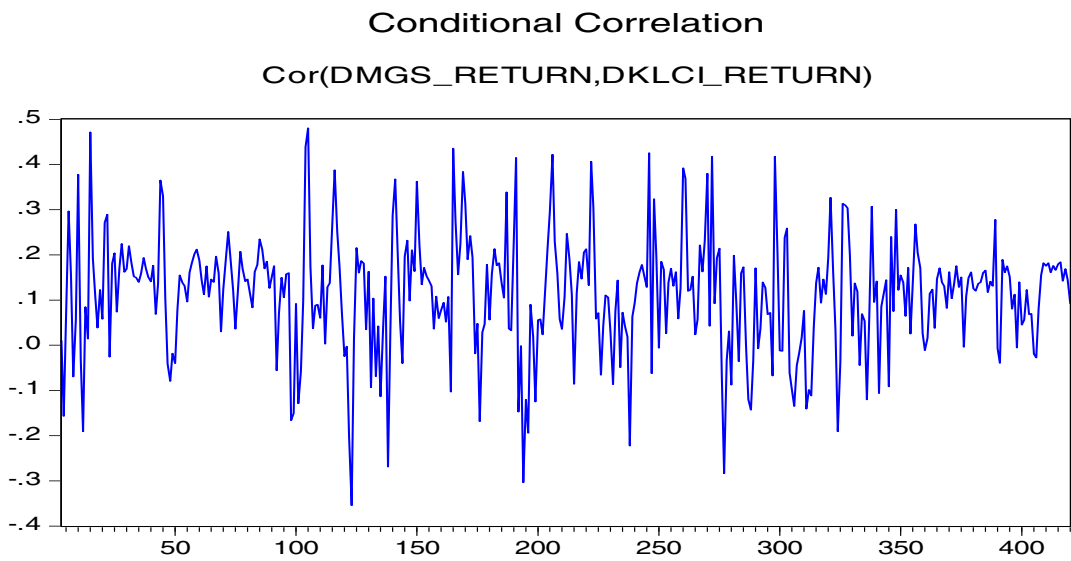
Conditional Correlation

Cor(DMGS_RETURN,DKLCI_RETURN)

Figure 2. Time-Varying Conditional Correlation for KLCI&MGS with an AR (-1)-GARCH (1, 1)-DCC (1, 1) model.

Conditional Correlation

Cor(DGII_RETURN,DKLCI_RETURN)

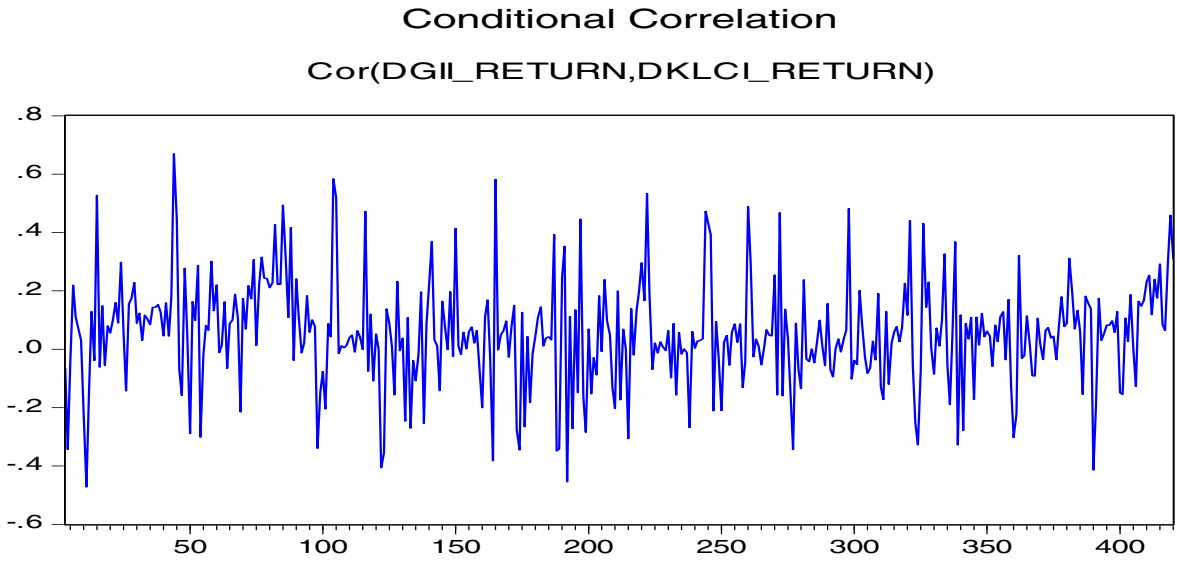Figure 3. Time-Varying Conditional Correlations for KLCI&GII with an AR (-1)-GARCH (1, 1)-DCC (1, 1) model

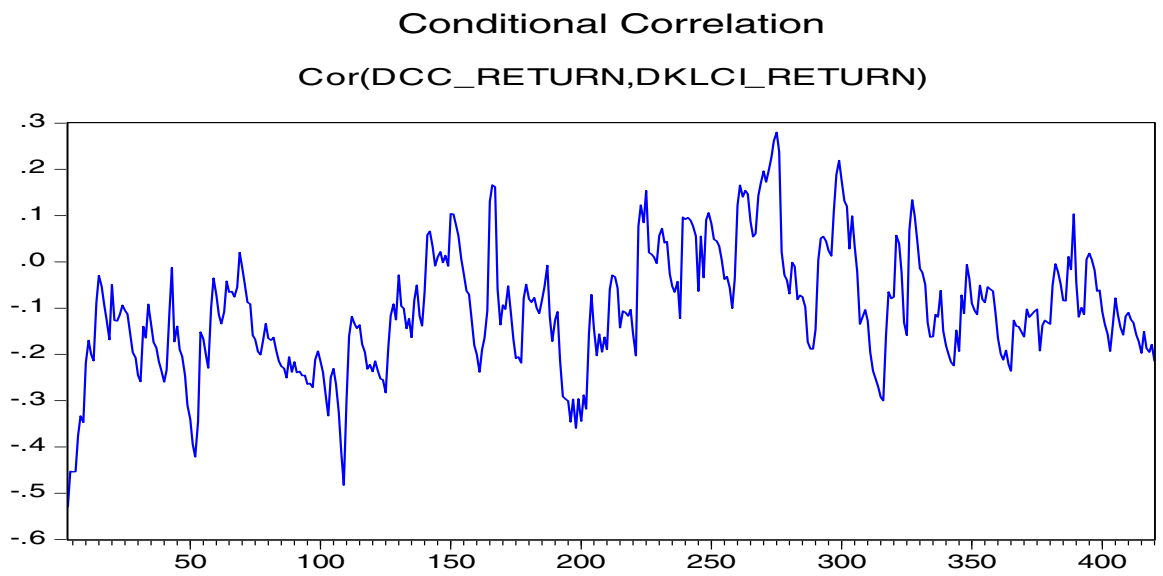## Conditional Correlation

Cor(DCC_RETURN,DKLCI_RETURN)

Figure 4. Time-Varying Conditional Correlations for KLCI&CC with An AR (-1)-GARCH (1, 1)-DCC (1, 1) model

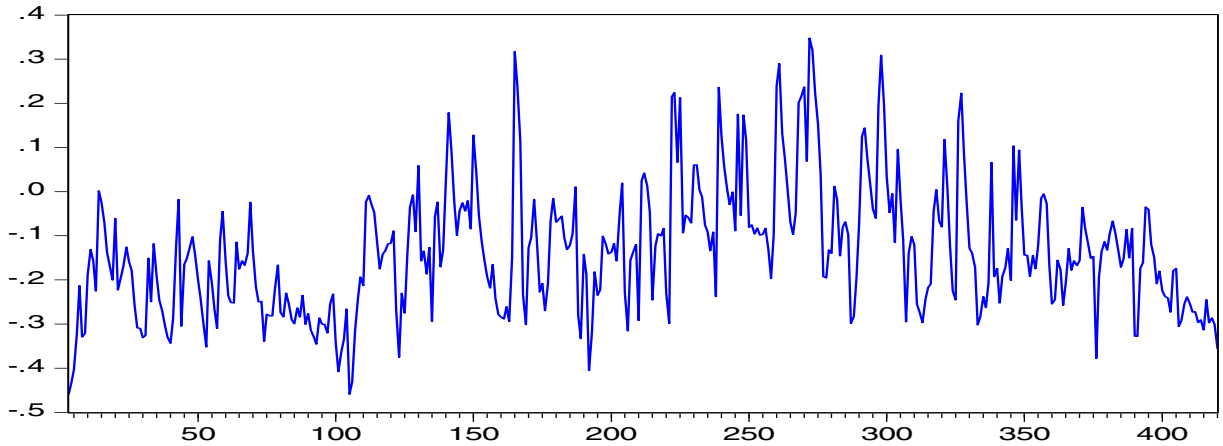## Conditional Correlation

Cor(DCI_RETURN,DKLCI_RETURN)

Figure 5. Time-Varying Conditional Correlations for KLCI&CI with An AR (-1)-GARCH (1, 1)-DCC (1, 1) model

4.4 Flight to Quality: Stock and Bond

Table 3: Test of Correlation between Malaysia Stocks Index Return and Bond Index Return (2006-2014)

Period/Types Of Bond	KLCI&MGS	KLCI&GII	KLCI&CC	KLCI&CI
Pre- Crisis **(Jan 2006-June 2008)**	0.054658	0.128893	0.145338	0.103221
Crisis **(July 2008-March 2009)**	0.054786	0.047281	-0.091435	-0.102179
Post- Crisis **(April 2009- December 2014)**	0.397249	0.389446	0.557073	0.541281

   The results above show that correlation between KLCI & MGS, KLCI & GII, KLCI & CC and KLCI & CI is positive during pre-crisis period. KLCI&CC shows the highest correlation among other with the correlation value 0.145338. However, this study finds significant negative change in correlations during the crisis period. The correlation of KLCI & CC and KLCI & CI turn to negative correlation with value -0.091435 and -0.102179. As we can see from the finding that there is clear pattern in correlation structure of stock and bond return. It indicates that flight-to-quality phenomena occur when the correlation change from positive during pre-crisis period to negative correlation during crisis period. The investor will shift from risky investment to safer investment. In this case, investors will shift to CI and CC but not to MGS and GII. Specifically, investors in the stock market are concerned about the possibility of an overall crash in the international stock markets during the crises. Hence, they withdraw their funds and invest in bond market, which are less likely to default during the market turmoil. An implication of this finding, government should facilitate the development of their local bond markets to enable investors to diversify their investments, to limit a wipe out of asset returns during financial crisis. The result support by previous research by Baur and Lucey(2009), Durand et.al(2010) Caballero and Krishnamurthy 2008. During post-crisis, the correlation value for stock and bond index return shows a positive correlation. The highest correlation was KLCI & CC with value 0.557073. Next is KLCI&CI with correlation value 0.541281, followed by KLCI & MGS and KLCI & GII with value of correlation 0.397249 and 0.389446. It indicates that investors remain with their investment decision and no more flight exists during post-crisis episode. Most of the

institutional investors shift to corporate bond Islamic (CI) because CI has high negative correlation during crisis. This implies that flights have the potential to increase the stability and resiliency of the financial system since they can reduce the losses that investors suffers during crisis period.

5. Conclusion

Based on result time varying stock-bond correlation with dynamic conditional correlation estimator (DCC) is comparing the graphic volatility and correlation between stock and bond. Figure 1.2, 1.3 1.4 and 1.5 show that the degree of the dispersion for KLCI & MGS, KLCI & GII, KLCI & CC and KLCI & CI. From the group of analysis, the result shows that the KLCI & CC and KLCI & CI show the clear range of volatile and correlation throughout the sample period.The objective of this paper to examine the existence of flight to quality from stock market to bond market. From the findings and discussion above, shows that KLCI & MGS, KLCI & GII, KLCI & CC and KLCI & CI are positive correlation during pre-crisis. However, for crisis period show that KLCI & CC and KLCI CI are negative correlation for DCC Model computer generated result. It is clear to indicate that, during crisis period, investor will shift their investment from stock to bond. The result support by previous research by Baur and Lucey(2009), Durand et.al(2010) Caballero and Krishnamurthy 2008 .The types of bond which most preferable are corporate bond conventional and corporate bond Islamic rather than government bond. It is because, government bond involved the government policy, intervention and the amount of bond is huge amount to compare with corporate bond. The study also find that the corporate Islamic bond show the large negative correlation. It means that, most of the investors shift their investment from stock to corporate Islamic bond. As a current environment, corporate Islamic bond (sukuk) is among the preferable investment among investors.

Acknowledgements

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