



الجامعة الإسلامية العالمية ماليزيا
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
يُونِبَرَسِيَّتِي إِسْلَامِيَّةً أَبَارًا يَجْنِبًا مِلِّسِيَّةً

Diversification in Conventional and Islamic Stock Indices: Evidence from Multivariate-GARCH Analysis

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**Theoretical Underpinnings &
Literature Review**



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Data Analysis & Discussion



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1.0 Introduction

1.1 Background of the Study

- International investors are actively looking for investment opportunities that can **lower unsystematic risks**
- **Investment diversification** in cross-border markets as well as into different classes
- But, how do they identify this?
- Asset correlation - **The lower correlation between assets, the greater risk reduction**

1.2 Problem Statement

- Earlier studies found that diversification benefits may exist for investors and fund managers by creating a well-diversified portfolio with lowest possible risks ([Grubel, 1968](#); [Levy & Sarnat, 1970](#); [Agmon, 1972](#); [Lessard, 1973](#); [Solnik, 1974](#); [Smith et al. 1993](#)).
- However, some studies showed that the international capital markets have been increasingly integrated with evidences of increased correlations among asset returns ([Von Furstenberg and Jeon, 1990](#); [Masih & Masih, 1999](#); [Driessen & Laeven, 2007](#); [Christoffersen et al., 2012](#), [Saiti et al., 2014](#); [Nguyen & Elisabeta, 2016](#)).
- Given mixed previous findings, there are obvious **needs to gain comprehensive understanding** on asset returns movements in different markets by providing more recent empirical evidence.

1.2 Problem Statement

- The global markets have recently glimpsed an **economic downturn** which sparks a fear of another global financial crisis
- Please see examples in the next slides
- The Malaysian financial markets seem to be highly susceptible to the recent **devaluation of ringgit** and serious **fluctuation of global commodity prices**
- The present study is motivated to assist the Malaysian-based investors in **identifying possible abroad investment opportunities for diversification** purposes

High volatility for equities, bonds and currencies...



Source: Thomson Reuters Eikon

Oil price had fallen below USD28 to its lowest point over the last 13 years...

Crude oil (barrel)

4:02 AM ET 11/16/2016

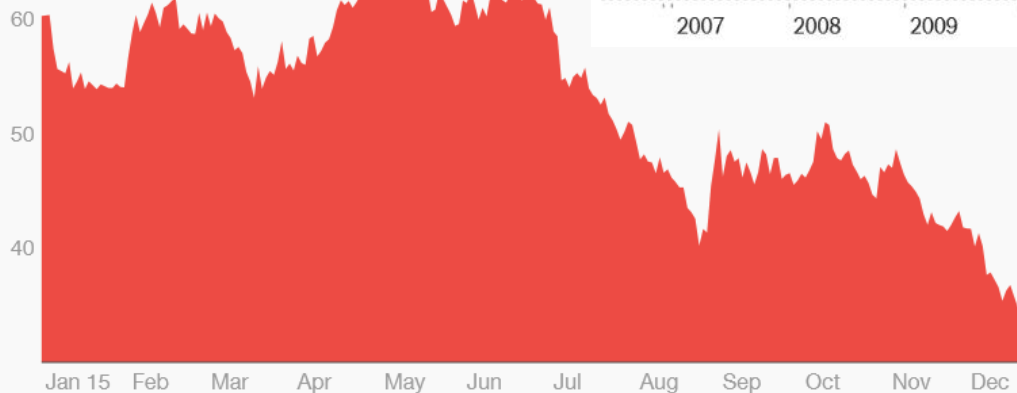
\$45.39 -\$17.55 -27.88%



Epic oil crash

Crude down 42% in 2015 alone

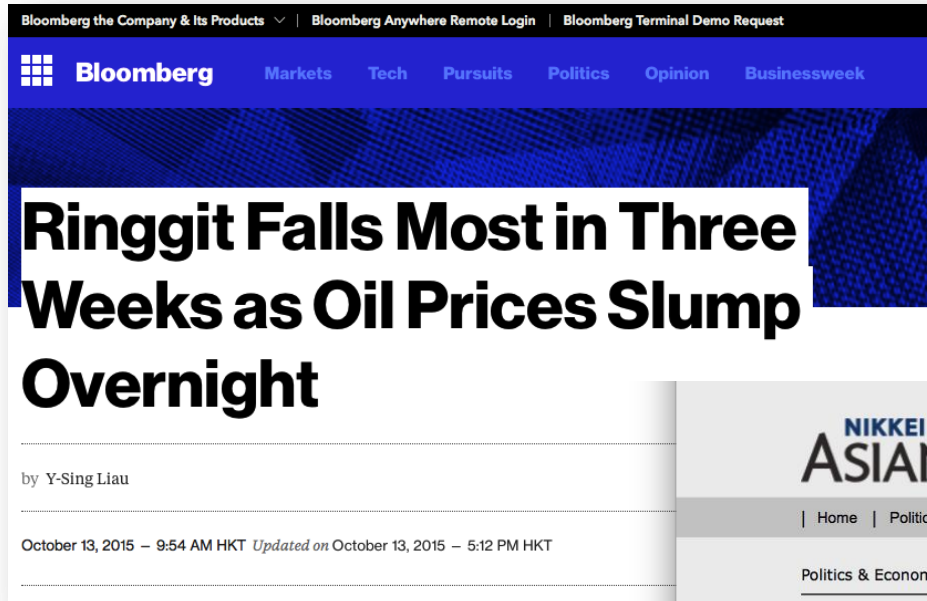
70



Source: Thomson Reuters

Source: CNN Money

Ringgit fell below RM4 per USD for the first time since the 1997 financial crisis...



KLCI gets the hit too...

THE STAR ONLINE

Dramas, variety, movie

News Business Sport Metro Tech Lifestyle Opinion Videos

Business News Home > Business > Business News

Tuesday, 18 August 2015

Ringgit, KLCI continue to fall

BY NADYA NGUI

FACEBOOK TWITTER GOOGLE+ LINKEDIN



Bloomberg Markets Tech Pursuits Politics Opinion Businessweek

Ringgit Falls to New 1998 Low as Asia Selloff Sends KLCI Lower

Thursday, 9 July 2015

by Elffie Chew

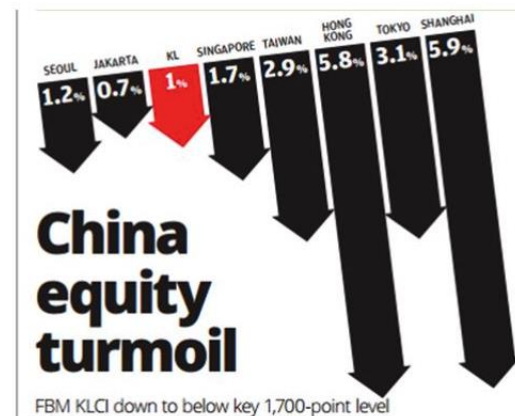
September 7, 2015 – 9:14 A

China equity turmoil hits Malaysia too, KLCI below key 1,700-point

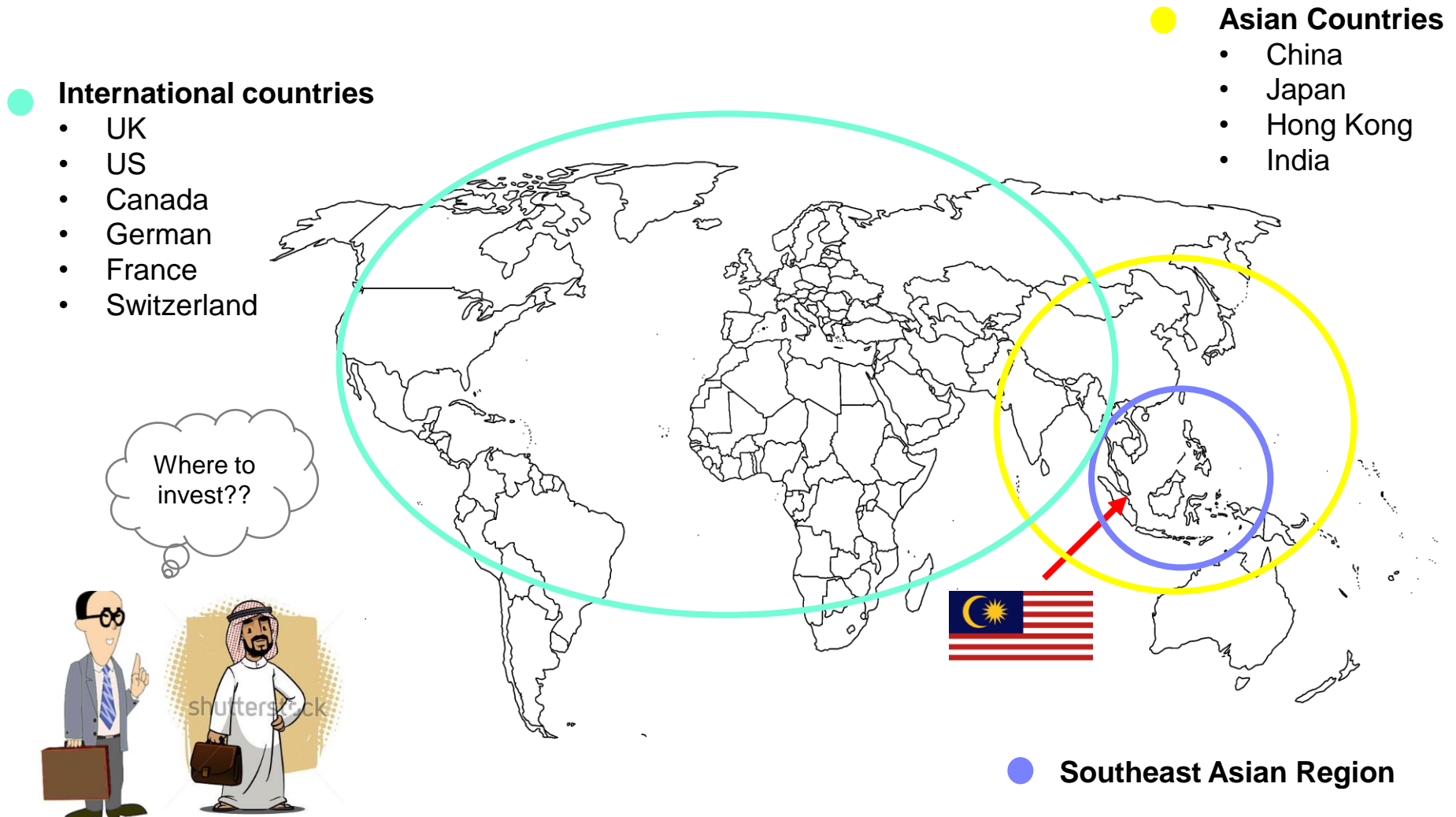
BY CECILIA KOK

FACEBOOK TWITTER GOOGLE+ LINKEDIN

Malaysia benchmark Foreign-exchange



If the Malaysia-based investors were to diversify into the world's largest stock exchange markets...



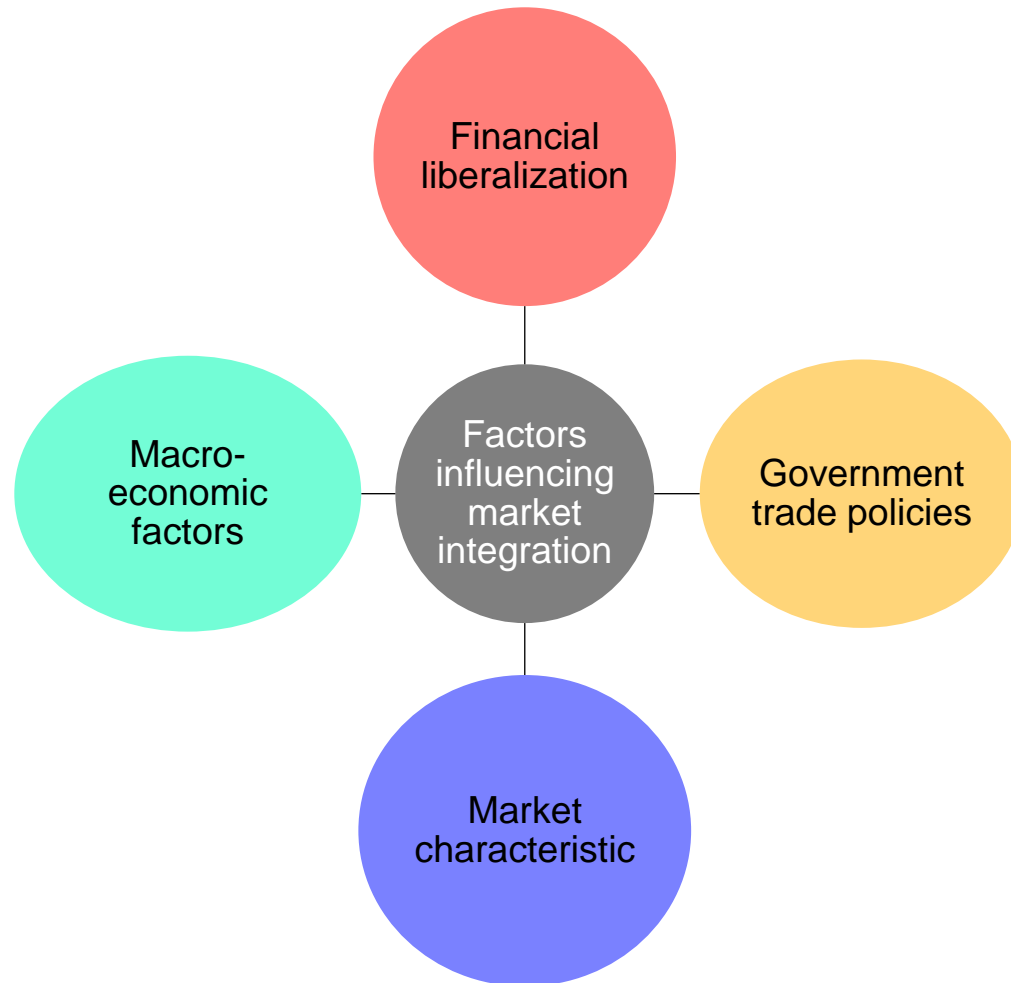
1.3 Research Objectives

1. To empirically examine the dynamic conditional volatilities and correlations of the returns of the MSCI Malaysia stock index and both the selected Asian and international conventional and Islamic stock index returns.
2. Do the Malaysia-based conventional equity investors benefit from diversifying their assets into both the selected Asian and international conventional and Islamic stock indices?

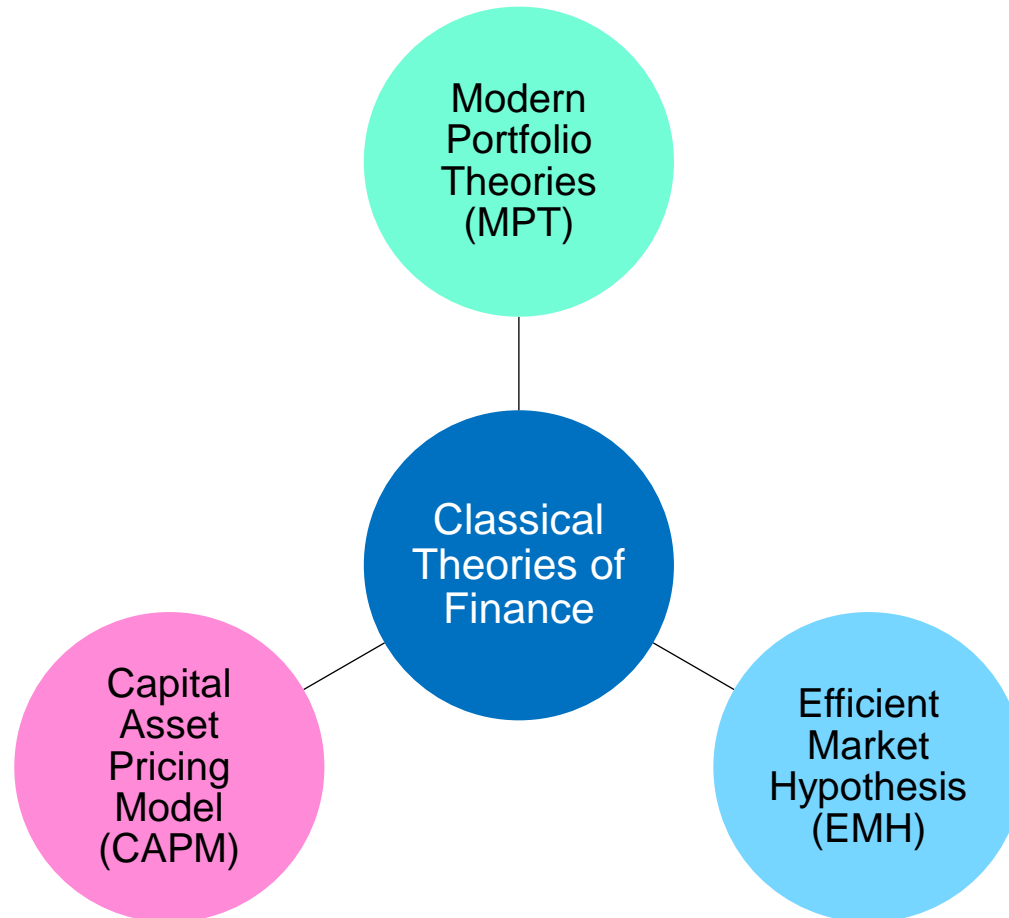
2.0 Theoretical Underpinnings & Literature Review

2.1 Market Integration

- How do we define market integration?



2.2 Related Finance Theories



2.3 Critical Review of Previous Studies

- Studies on Regional Diversification Benefits
- Studies on International Diversification Benefits

Studies on Regional Diversification Benefits

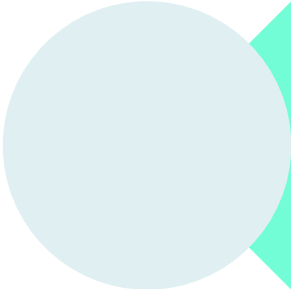
- [Huberman \(2001\)](#) and [Grinblatt and Keloharju \(2001\)](#) argued that investors would prefer to invest in domestic or familiar markets compared to foreign
- Studies on correlation between regional indices are rich in literature
- However, evidence showing intra-regional diversification benefits for investors within similar trade region has been lacking with notable exception of [Masih and Masih \(1999\)](#), [Driessen and Laeven \(2007\)](#) and [Hammoudeh et al. \(2008\)](#).

Studies on International Diversification Benefits

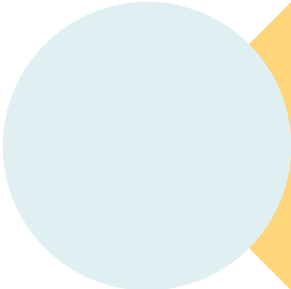
Authors	Countries/Regions	Results
Narayan et. al (2014)	Emerging markets v. US, Australia, China & India	China's market correlation with other five emerging Asian markets is much higher compared to that of Australia and the US
Nguyen & Elisabeta (2016)	China v. ASEAN	Correlation increased significantly during the crisis
Christoffersen (2012) & Christoffersen et al. (2014)	Developed markets v. Emerging markets	Diversification benefits reduced; although higher in emerging markets compared to developed markets
Burdekin & Siklos (2012)	Asia Pacific	Diversification benefits decreased

3.0 Research Methodology

3.1 Multivariate GARCH-DCC

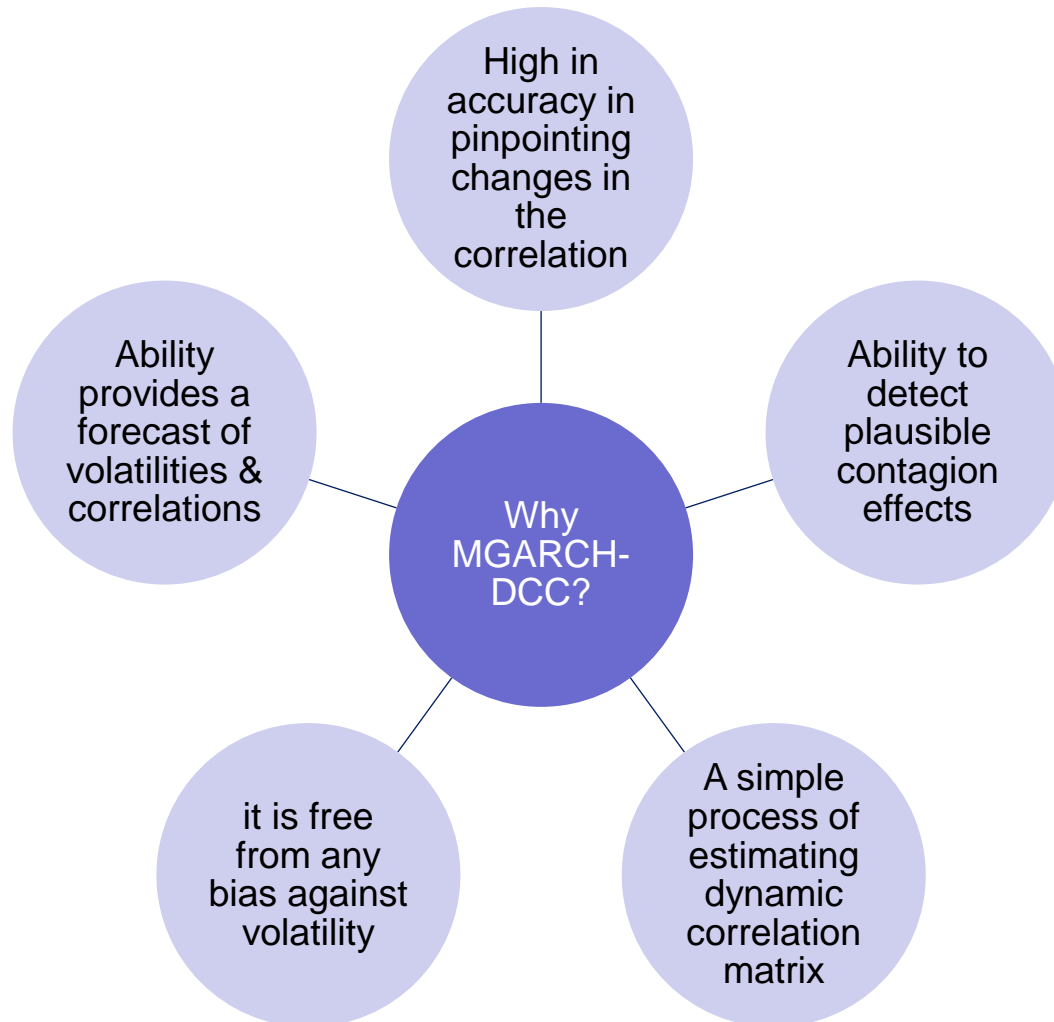


Comparison between the Gaussian DCC model and the t-DCC model



Plotting the estimated conditional volatilities and correlations.

Why did we choose MGARCH-DCC?



3.2 Data

- Daily time series closing price data from Thomson Reuters Datastream
- From 29/6/2007 to 30/6/2016 (8 years)

Base Indices

- MSCI Malaysia Index

Asian Indices

- Asian Conventional Indices
- MSCI Southeast Asia Index
- MSCI China Index
- MSCI Japan Index
- MSCI Hong Kong Index
- MSCI India Index
- Asian Islamic Indices
- MSCI Southeast Asia Islamic Index
- MSCI China Islamic Index
- MSCI Japan Islamic Index
- MSCI Hong Kong Islamic Index
- MSCI India Islamic Index

International Indices

- International Conventional Indices
- MSCI United States Index
- MSCI United Kingdom Index
- MSCI Canada Index
- MSCI France Index
- MSCI Germany Index
- MSCI Switzerland Index
- International Islamic Indices
- MSCI United States Islamic Index
- MSCI United Kingdom Islamic Index
- MSCI Canada Islamic Index
- MSCI France Islamic Index
- MSCI Germany Islamic Index
- MSCI Switzerland Islamic Index

4.0 Data Analysis & Discussion

4.1 Model Selection

No.	Index Returns	Gaussian model	t-DCC model	The estimated d.f. for the t-normal distribution
1	MSCI Malaysia index v. Conventional MSCI Asian indices	46,426	46,829.2	7.6849
2	MSCI Malaysia index v. MSCI Asian Islamic indices	45,714.5	46,110	7.7757
3	MSCI Malaysia index v. Conventional MSCI international indices	57,131.1	57,576.9	7.7993
4	MSCI Malaysia index v. MSCI international Islamic indices	55,651.3	56,024.9	8.5134

4.2 Identifying Diversification Benefits for Conventional Malaysia-Based Investors

Unconditional Volatilities of Asian Index Returns

No	MSCI Conventional Indices	Unconditional Volatility	MSCI Islamic Indices	Unconditional Volatility
1	Malaysia	0.010738	-	-
2	Southeast Asia	0.012027	Southeast Asia	0.012064
3	Hong Kong	0.014307	Hong Kong	0.012955
4	Japan	0.014778	Japan	0.014941
5	India	0.018172	India	0.018022
6	China	0.018965	China	0.019835

Unconditional Volatilities of International Index Returns

No	MSCI Conventional Indices	Unconditional Volatility	MSCI Islamic Indices	Unconditional Volatility
1	Malaysia	0.010738	-	-
2	Switzerland	0.013084	Switzerland	0.011837
3	US	0.013481	US	0.012674
4	UK	0.016126	UK	0.016501
5	Canada	0.016187	Germany	0.017686
6	Germany	0.017590	France	0.017932
7	France	0.018059	Canada	0.019034

4.3 Identifying Diversification Benefits for Conventional Malaysia-Based Investors

Unconditional Correlations between MSCI Malaysia Index Returns & the Asian Index Returns

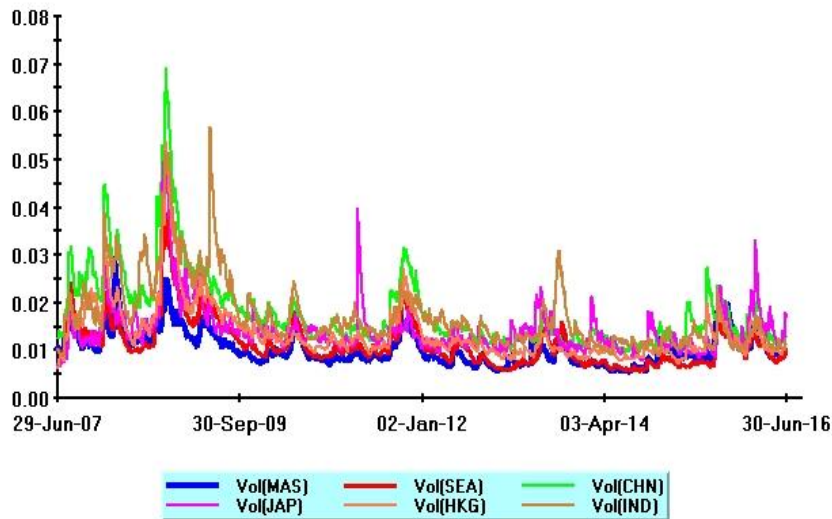
No	MSCI Conventional Indices	Unconditional Correlation	MSCI Islamic Indices	Unconditional Correlation
1	Japan	0.37943	Japan	.37592
2	India	0.46927	Hong Kong	.45258
3	Hong Kong	0.53501	India	.48977
4	China	0.55921	China	.56643
5	Southeast Asia	0.79940	Southeast Asia	.76973

Unconditional Correlations between MSCI Malaysia Index Returns & the International Index Returns

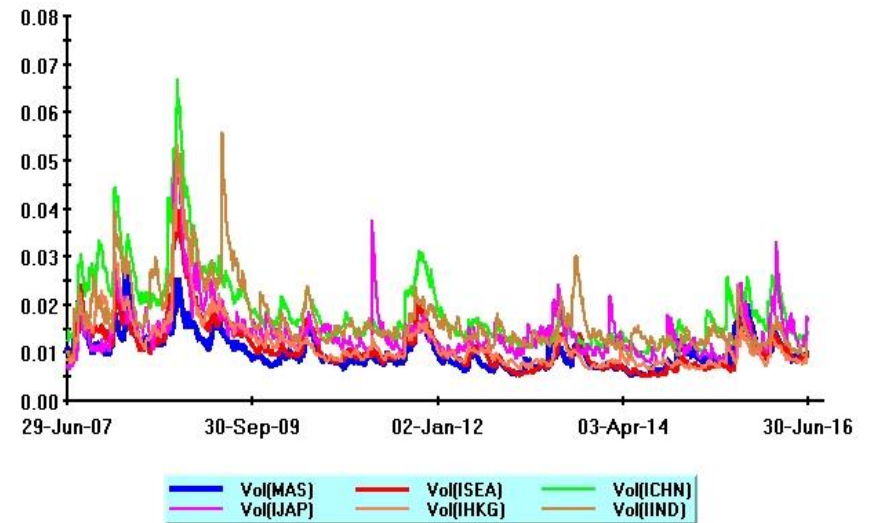
No	MSCI Conventional Indices	Unconditional Correlation	MSCI Islamic Indices	Unconditional Correlation
1	US	0.15403	US	0.16387
2	Canada	0.30619	Canada	0.27954
3	Switzerland	0.35182	Switzerland	0.30989
4	Germany	0.35277	Germany	0.35148
5	France	0.36868	France	0.35357
6	UK	0.38534	UK	0.37610

Plotting the Conditional Volatilities of the Asian Stock Returns

Plot of conditional volatilities and correlations

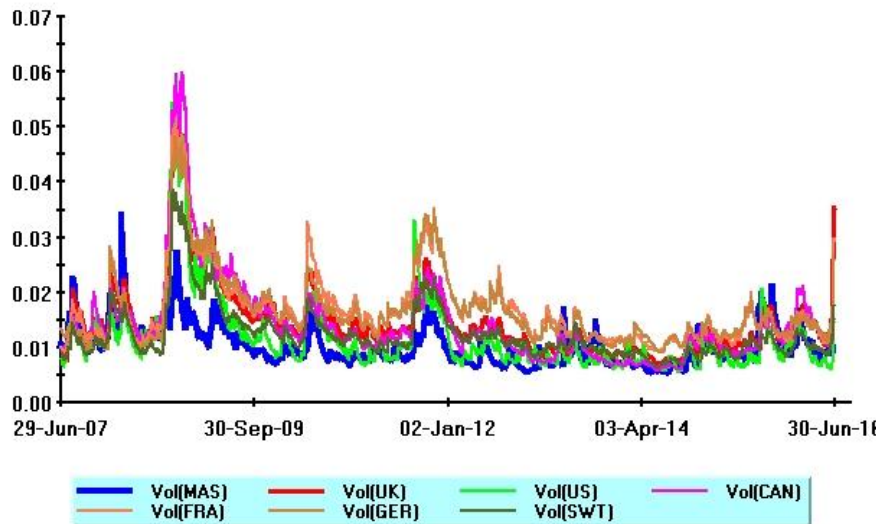


Plot of conditional volatilities and correlations

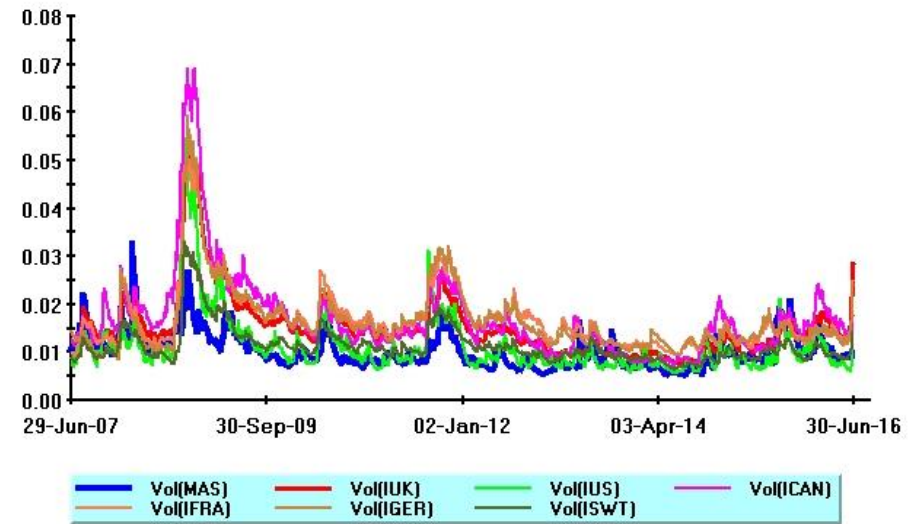


Plotting the Conditional Volatilities of the International Stock Returns

Plot of conditional volatilities and correlations

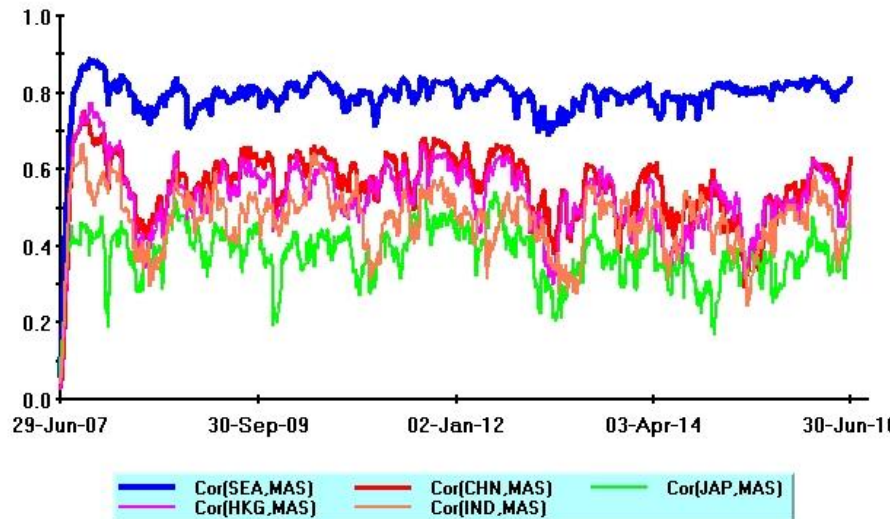


Plot of conditional volatilities and correlations

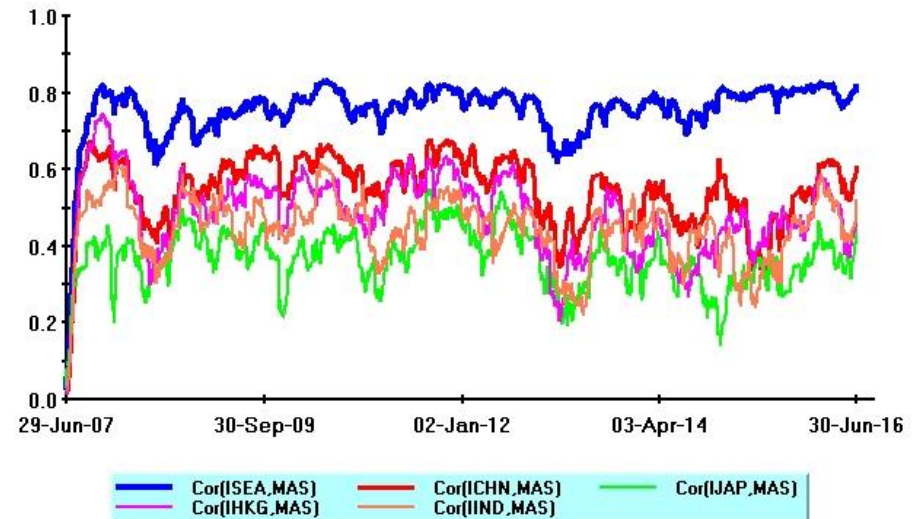


Plotting the Conditional Correlations Between The MSCI Malaysia Index and the MSCI Asian Indices

Plot of conditional volatilities and correlations

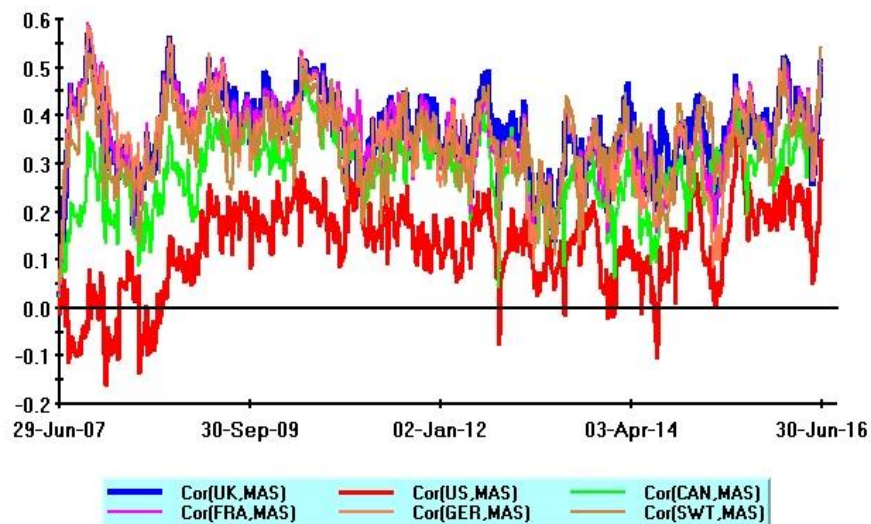


Plot of conditional volatilities and correlations

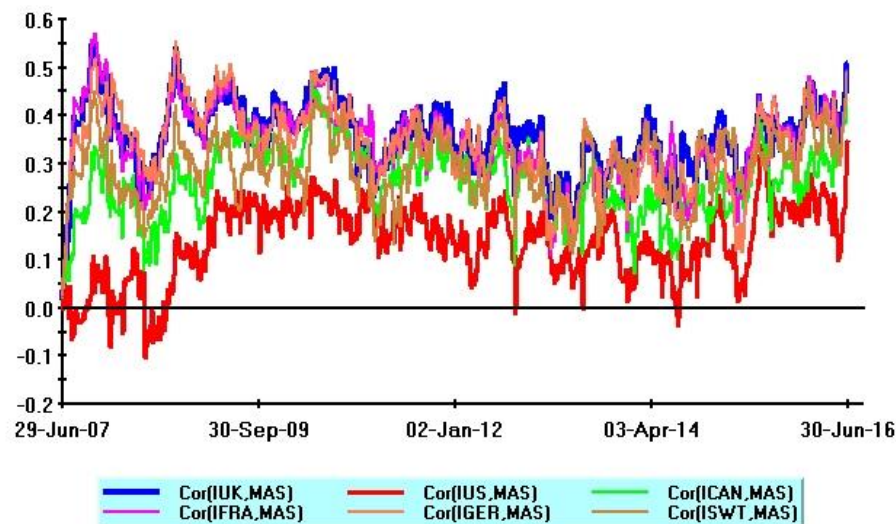


Plotting the Conditional Correlations Between The MSCI Malaysia Index and the MSCI International Indices

Plot of conditional volatilities and correlations



Plot of conditional volatilities and correlations



5.0 Concluding Remarks

- This study aims to assist the Malaysia-based equity investors to identify potential portfolio diversification benefits by examining the dynamic conditional correlations between the Malaysian stock index returns and the returns of the Southeast Asian market index and the world's largest stock market indices.
- The multivariate GARCH-dynamic conditional correlation is applied to estimate the time-varying linkages of the selected Asian and international stock index returns with the Malaysian stock index returns, covering approximately 8 years daily starting from 29 June 2007 to 30 June 2016.

- The study found that the highest increase in conditional volatilities of both conventional and Islamic MSCI stock index returns happened during the period of the 2008 global financial crisis.
- Another important finding is that the Malaysian stock index is proven to be more stable during the financial crisis compared to other Asian and cross-border markets.
- In general, the results also indicate that both Asian and international Islamic stock indices are more or less volatile than its conventional counterparts, thus **conflicting** with the proposition that Islamic equities offer less risky returns due to its compliance to *Shariah* principles such as the prohibition of usury, excessive uncertainty and gambling.

- Put differently, the study found that both the Asian and International Islamic stock indices **do not provide extra diversification benefits** compared to its conventional counterparts as far as the Malaysia-based equity investor is concerned.
- In term of regional portfolio diversification, the results tend to suggest that **both the conventional and Islamic MSCI indices of Japan provide more diversification benefits** compared to other regional markets.
- Meanwhile, in term of international portfolio diversification, the results tend to suggest that **both the conventional and Islamic MSCI indices of International markets provide more diversification benefits compared to Regional markets.**

- Thank you