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THE DYNAMIC RELATIONSHIPS BETWEEN CASH AND FUTURES MARKETS: THE MALAYSIAN EXPERIENCE UNDER A SHIFT FROM FLEXIBLE TO FIXED EXCHANGE REGIMES

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Abstract: *The purpose of this study is to examine the dynamic relationships between the Kuala Lumpur Stock Exchange Composite Index (KLSE CI) (currently known as FTSE Bursa Malaysia KLCI) and the Kuala Lumpur Stock Exchange Composite Index Futures (KLSE CI Futures), spot month futures contract under a shift from flexible to fixed exchange regimes. The VAR model of Johansen-Juselius multivariate cointegration test, multivariate Granger-Causality test are applied to capture the dynamic linkages between KLSE CI and KLSE CI Futures in the periods of pre- and during the Asian currency crisis under flexible exchange regime and after the crisis fixed exchange regime. The empirical results of this study display that the KLSE CI and KLSE CI Futures are cointegrated and there is long run causality between KLSE CI and KLSE CI Futures in the three sub-sample periods. In the short run, there are evidences of contemporaneous causality running between the variables. The result exhibits that only the KLSE CI does "Granger" causes the KLSE CI Futures in the first sub-sample period. In the second sub-sample period, the KLSE CI Futures "Granger" causes the KLSE CI. In the third sub-sample period, the result displays that the KLSE CI "Granger" causes the KLSE CI Futures. As a conclusion, this study shows that the KLSE CI Futures leads the KLSE CI, especially during the crisis under flexible exchange regime, which implies that KLSE CI Futures has some predictive power for the KLSE CI.*

JEL Classification: G01, G13, G14.

Keywords: *Dynamic relationships, cash market, futures markets, Malaysia, Flexible and Fixed Exchange Regimes.*

1. INTRODUCTION

The golden rule of fund management is simply to bestow general returns with sound risk management strategies. For that reason, the key ingredients are to look

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for more instruments for investment and risk management to win the confidence of potential market participants. Investment fund managers worldwide have been utilising various sophisticated derivative related instruments to trade, hedge and arbitrage in the securities, capital and other financial markets to maximise returns while maintaining the nest of eggs in strict prudence.

An economic environment characterised by growing uncertainties in the world's financial markets, sharp increases or decreases in the government debt, political environment changes and greater financial interdependence among nations has caused prices of commodities, exchange rates, interest rates and share prices to become increasingly volatile.

In 15 December 1995, the birth of the Kuala Lumpur Options and Financial Futures Exchange (KLOFFE) heralded a significant event in the development of the Malaysia's capital market with the launch of KLOFFE's stock index futures contract (KLSE, 1996). It is a screen-based market, which means there is no physical trading floor. Instead, bids and offers are entered into the computer and matched electronically. With its introduction, Malaysia became the third Asian economy after Hong Kong and Japan to offer domestic equity derivatives products. Malaysia has since then been well positioned to capitalise on an anticipated derivatives market explosion in emerging industrialised economies and has sufficiently been equipped to face the move towards globalisation which is expected to create an upsurge in the demand for capital as well as for risk management facilities.

It is well known that the futures market can function well only when the futures and cash prices are highly correlated or linked. Market linkage is essential to a successful futures market. The greater the degree of market linkage, the greater the effectiveness of the futures market in terms of performing its economics function (Wang and Yau, 1994). Hence, the estimation of the degree of market linkages is of paramount importance and interest to practitioners who engage in various hedging and arbitrage activities and to policymakers as well.

Understanding the behaviour of the financial futures market and its price movements has become a major determinant of profitability in investment and effective portfolio management. Trading strategy used to beat the market mainly lies in the market efficiency information wise. Under no circumstances should speculators earn consistent return with any trading strategy employed if the market is efficient. In other words, the futures prices must be an unbiased predictor of the spot price, otherwise speculators can profit from the bias. Although most of the past studies of empirical relationship between spot and futures prices have been carried out in developed markets, only few studies were focused on the emerging markets. Therefore, it is well worth studying the dynamic relationships between stock market and futures market in Malaysia.

Before 1997, Asia attracted almost half of the total capital inflow into developing countries by maintaining high interest rates attractive to foreign investors seeking a high rate of return. As a result, the regional economies of Malaysia, Thailand, Indonesia, Singapore and South Korea experienced a dramatic acceleration in asset prices achieving high growth rate of 8 - 12% GDP in the late 1980s and early 1990s. This remarkable accomplishment was highly acclaimed by IMF and World Bank as part of the Asian economic miracle. However, the Asian Currency Crisis in 1997 gripped much of East Asia by aggravating the depreciation of the currencies and economy. By end of 1997, the Kuala Lumpur Stock Exchange's composite index had plummeted more than 50% from above 1,200 to under 600, and the ringgit had plunged 50% of its value, dropping from above 2.50 to under 4.57 on (23 January 1998) to the dollar. The then prime minister, Datuk Seri Dr. Mahathir Mohamed took a drastic measure to impose stern capital controls after aid offered from the IMF was declined. Besides, a RM3.80 peg against the US dollar was introduced through Bank Negara Malaysia to move the ringgit from flexible exchange regime to fixed exchange regime, which started in 2 September 1998 and was then abandoned in 21 July 2005. (Wikipedia, 2014).

There has scant research studied on the dynamic relationships between cash price index and future price index in Malaysia, an emerging market, particularly under a shift from flexible to fixed exchange regime following the outbreak of Asian Currency Crisis in 1997. The study, therefore, attempts to fill this literature gap by examining the short-run causality between the Kuala Lumpur Stock Exchange Composite Index (KLSE CI) (currently known as FTSE Bursa Malaysia KLCI) and the Kuala Lumpur Stock Exchange Composite Index Futures (KLSE CI Futures) before, during, and after the 1997 Asian Currency Crisis when there was a switch from pre- and-during-crisis-flexible-exchange regime to after-crisis-fixed-exchange regime and to measure the stability of long-run relationships between KLSE CI Futures and KLSE CI by applying Error Correction Model.

The remainder of this paper is structured as follows. The following section describes the data set and methodology. Section 3 presents the estimation results and findings. Finally, Section 4 draws our conclusion.

2. METHODOLOGY AND DATA

Many a research had investigated the lead-lad relationship of the cash market and the stock futures market with the use of the transaction data. Finnerty and Park (1987), Ng (1987), Kawaller, Koch, and Koch (1987), Harris (1989), Stoll and Whaley (1990), and Chan (1992) reported that price movements in the futures markets consistently led the stock index movements. There was however weak evidence that the stock index movements led to futures price changes. This lead-lag relationship between the futures and cash index markets could be assigned to lower transaction costs and less restrictive short selling in the futures market.

In some situations, informed traders may choose to trade in the spot (cash) market rather than in the futures market. For example, Subrahmanyam (1991) and Chan (1992) displayed that if an informed trader had specific firm-related information, it might be optimal to trade the shares of the firm directly rather than to trade the index futures. Thus, for some types of information, the transmission of information might flow from the spot to the futures market. This implied, as discussed by Chan et al. (1991), the possibility of a bi-directional lead-lag relationship between the futures and the cash returns. Athanasios (2010) studied the dynamic relationship between the FTSE/ASE-20 spot price index, the FTSE/ASE-20 future price index and their respective volatilities. The results reported unidirectional and bi-directional causal effects existed between the market indices and their volatilities.

Theoretically, the values of futures contracts can be computed by a purchase on either the futures or the underlying basket of stocks. If an investor buys the shares, he or she has to pay for them now but will obtain such benefit as dividends. On the other hand, the futures investor does not need to pay for the shares now, and therefore, he or she can make an investment of money into the fixed income products by earning interest. He or she, however, has to forgo the dividends that may be received by procuring the shares. As such, the futures prices need to reflect the interest that could be earned and the dividends foregone. The theoretical fair value estimate of the stock index futures price is reasonably approximated by the familiar net cost-of-carry model as follows:

$$F_t = S_t e^{(r-d)(T-t)}$$

Where

F_t = the index futures price at time t,

S_t = the spot index price at t,

r = the continuously compounded cost of carrying the spot index basket from the present t,

T = the expiration date of the stock index futures contract,

$T - t$ = the time remaining to expiration of the futures contract,

d = dividends yield on the stock index,

$r - d$ = the net cost of carry which is the time value cost of wealth tied up in the stock index investment, offset by the flow of dividends from the index.

The cointegration test is designed to examine long-run co-movements for a set of variables. In our study, we employ the Johansen-Juselius multivariate cointegration tests (Johansen, 1988 and Johansen & Juselius, 1990) to test the long-run relationships between KLSE CI and KLSE CI futures. Notably, Johansen procedure requires variables not to be integrated of order two, I(2). Johansen (1988) and Johansen and Juselius (1990) developed the maximum likelihood estimation procedure to test for cointegrating relationship and the number of cointegrating vectors existing between two or more variables. This test is superior to the bivariate cointegration test since it applies to multiple variables in the equation. Multivariate cointegration test employs test statistic that has unique distribution, which is a function of a single parameter. It can be employed to evaluate cointegration relationships among a group of two or more variables. The Johansen-Juselius procedure begins with the following least square regressions.

$$\Delta Y_t = \alpha_1 + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \mu_{1t}$$

$$Y_{t-p} = \alpha_1 + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \mu_{2t}$$

Two Likelihood Ratio (LR) test statistics are examined using the residual vectors μ_{1t} and μ_{2t} in order to determine the number of unique cointegrating vectors in Y_t. The first one is the trace test and the formula is as follows:

$$\tau_{trace(r)} = -T \sum_{i=r+1}^{\rho} \ln(1-\lambda_i)$$

where T is the number of observation, λ_{r+1}, …, λ_ρ are the $\rho - r$ smallest squared canonical or eigenvalue. The hypothesis is that there are at most r cointegrating vectors. The second test for cointegration is known as the maximum eigenvalue test, which is more powerful and preferable compared to trace test (Johansen & Juselius, 1990). The null hypothesis is r cointegrating vectors, against the alternative of $r + 1$ cointegrating vectors. As a result, test the null of r = 0 versus the alternative hypothesis of $r = 1$. The statistic is shown as follows:

$$\tau_{\max(r,r+1)} = -T \ln(1-\lambda_{r+1})$$

where is the largest squared canonical correlation or eigenvalue.

After determining the number of cointegrating vector, the residuals generated from the Johansen Cointegration Equation can be employed into Vector Error Correction Model (VECM). The Granger Causality Test must be conducted in the VECM by requirement of the Vector Auto Regression (VAR) analysis. Thus, the purpose to obtain the relevant error correction term from the Johansen Multivariate Cointegration equation must be included to avoid omission of important constraints and misspecification.

The vector time series can be expressed as $Y_t = (Y_1, Y_2 \ldots Y_n)'$, while the common VECM formula is as below:

$$\Delta Y_t = \delta_0 + \Pi Y_{t-1} + \sum_{i=1}^{m} \theta_i \Delta Y_{t-i} + \varpi_t$$

where Y_t is an (n x n) vector of variables, δ_0 is an (n x 1) vector of constants, Π and θ are the (n x n) matrices reflecting the long-run and short-run effects, ω is an (n x 1) vector of white noise disturbances. If series are not cointegrated, so the $\Pi = 0$ and the VECM is an unrestricted VAR. Anyhow, if there is cointegration relationship, the Π can be decomposed into two (n x r) matrices of α and β, for example $\Pi = \alpha\beta'$. For the error correction term(s), a more common error correction term(s) is shown as below:

$$A(B)(1\text{-}B)Y_t = -\alpha\varepsilon_{t-1} + d(B)\mu_t$$

where μ_t is a stationary multivariate disturbance, with $A(0)=1$, $A(1)$ has all the elements finite and $\alpha \neq 0$. This formula implies the amount and direction of ΔY_t in terms of size as well as sign of previous equilibrium error, ε_{t-1}. If the coefficient of error-correction term (ε_t) is statistically insignificant, this indicates that the variable does not deviate from the equilibrium.

Granger Causality test is a test that identifies the statistical significance of the t-test for the lagged error-correction term and F-test attributed to the joint significance of the sum of lags of each independent variable. The significance of both t-test and F-test in the model indicates the Granger-endogeneity of the dependent variable. While the non-significance of t-test and F-test indicates the Granger-exogeneity of the dependent variables, the VECM can also be used to discriminate between short-run and long-run Granger-causality. The F-test of the first differenced independent variables indicates the "short-run" causal effects, whereas the t-test of the lagged error correction term contains the long-run information. Therefore, the significance of the t-test of the lagged error correction term indicates the "long-run" causal relationships.

The data employed in this study is the daily observed stock market indices in the Kuala Lumpur Stock Exchanges (KLSE) (currently known as FTSE Bursa Malaysia), that is, Composite Index and futures market indices (spot month futures contract) in the Kuala Lumpur Options and Financial futures Exchange (KLOFFE). The data for KLSE CI (currently known as FTSE Bursa Malaysia KLCI) and KLOFFE are collected from the various series of Investors Digest, KLSE Daily Diary and KLOFFE in three different periods (before, during and after crisis), which is collected from 15 December 1995 to 21 July 2005. The sub-sample period before the crisis covers from 15 December 1995 to 30 June 1997; the sub-sample period during the crisis covers between 1 July 1997 and 1 September 1998; and the sub-sample after the crisis covers from 2 September 1998 to 21 July 2005. The daily closing prices are considered as the daily observations in this study. Therefore, the overall number of observation for Kuala Lumpur Stock Exchange Composite index (currently known as FTSE Bursa Malaysia KLCI) and Future Markets Index (spot month futures contract) is 2364. The daily data is employed in this study because most of the previous studies have used the daily data and it is easier for direct comparison with previous studies. Furthermore, Edward (1988) stated that the daily price data were more relevant to the current concerns about increasing price volatility that the emphasis was on large changes in day-to-day prices. Besides that, all weekends and holidays are deleted from the samples.

3. EMPIRICAL RESULTS

Table 1 shows the results of Augmented Dickey-Fuller (ADF) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) unit root tests. The results clearly show that all variables tend to be nonstationary at level. The ADF test failed to reject the null hypothesis of nonstationary while the KPSS test has successfully rejected the null hypothesis of stationary at 1 percent significant level for any of the series in levels for Kuala Lumpur Stock Exchange Composite Index (KLSE CI) and Kuala Lumpur Stock Exchange Composite Index Futures (KLSE CI futures). The variables seem to be stationary at its first difference for all the three periods. At first difference level, the ADF test has well rejected the null hypothesis of unit root at 1 percent significant level whilst the KPSS test refused to reject the null hypothesis of stationary. The stationarity at first difference for KLSE CI and KLSE CI futures indicates that both series are integrated of order one.

The results of the cointegration analysis are presented in Table 2, which lists the λ_{max} value from multivariate cointegration test in three sub-sample periods. Given that there are two variables in the model for each sub-sample period, there could be at most a maximum of one cointegrating vector, so that r could be equal to 0, or 1. The values of test statistics of both λ_{max} and trace test indicate that the null hypothesis of no cointegrating vector (r=0) is rejected at the 1% level of significance for the three sub-sample periods. This implies that there exists at least one long-run equilibrium relationship between the KLSE CI and KLSE CI Futures for the three sub-sample periods. However, the null hypothesis of one cointegrating vector (r=1) could not be rejected at the 1% level of significance for the three sub-sample periods. Since the empirical result is consistent in the maximum eigenvalue and trace test, we choose the results with one cointegrating vector to be incorporated into the VECM causality test. As a summary, the existence of common trends in the model displays that there are some causal relationships between two variables in the system. Either future fluctuations of the KLSE CI or KLSE CI Futures could be forecast to some extent, using a part of the information set provided by the

Table 1
The Augmented Dickey-Fuller (ADF) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) Unit Root Tests

	ADF Test		*KPSS Test*	
	Constant without Trend	*Constant with Trend*	*Constant without Trend*	*Constant with Trend*
Sub-Sample Period: 15/12/95-30/6/97 (Pre-Crisis Flexible-Exchange Regime)				
Levels				
KLSE CI	-2.5589(1)	-2.0034(1)	5.2165(1)*	1.8674(1)*
KLSE CI FUTURES	-2.2797(0)	-1.6834(0)	4.8991(1)*	1.8106(1)*
First Differences				
KLSE CI	-16.5484(0)*	-16.6865(0)*	0.3583(1)	0.0571(1)
KLSE CI FUTURES	-17.5310(0)*	-17.6625(0)*	0.3338(1)	0.0583(1)
Sub-Sample Period: 1/7/97-1/9/98 (During-Crisis Flexible-Exchange Regime)				
Levels				
KLSE CI	-1.2297(1)	-2.3262(1)	5.4442(3)*	0.7167(3)*
KLSE CI FUTURES	-1.3078(0)	-2.3608(0)	10.6199(1)*	1.3678(1)*
First Differences				
KLSE CI	-14.4032(0)*	-14.3784(0)*	0.0982(3)	0.0957(3)
KLSE CI FUTURES	-16.8160(0)*	-16.7898(0)*	0.0841(1)	0.0795(1)
Sub- Sample Period: 2/9/98-21/7/2005 (After Crisis Fixed-Exchange Regime)				
Levels				
KLSE CI	-2.0430(3)	-2.1009(3)	10.0129(3)*	3.0330(3)*
KLSE CI FUTURES	-1.9030(3)	-2.0513(3)	7.3293(4)*	2.3877(4)*
First Differences				
KLSE CI	-38.6285(0)*	-38.6442(0)*	0.2691(3)	0.1965(3)
KLSE CI FUTURES	-29.6764(1)*	-29.6766(1)*	0.1923(0)	0.1391(0)

Notes: Figures in parenthesis ( ) represents the number of lag length used, which are selected based on Schwarz Info Criterion for the ADF test and Used-Specified Bartlett Kernel for the KPSS test. The asterisk (*) denotes the statistically significant at 1% level. These values are provided by the EVIEWS output based on Kwiatkowski-Phillips-Schmidt-Shin (1992) and Mackinnon (1996).

model. Nevertheless, the direction and the intensity of the causal effects can only be tested in the Vector Error Correction Model (VECM).

After identifying the number of cointegrating vector in model, three separate VECM models with stationary data are established for each sub-sample period. Causality test in Granger sense is conducted for each VECM to examine the direction of causal effects of variables in the system as well as to measure the dynamic properties of the estimated model. Basically, a VECM is a restricted VAR model that builds in cointegration. If there is no cointegrating vector in the model, the VAR will be applied to the model with data at their stationarity orders, for example,

Table 2
Johansen and Juselius Multivariate Cointegration Test

Variables: KLSE CI, KLSE CI FUTURES (Optimal lag=2)				
H_0: *rank=r*	λ_{max}	λ_{max} *(99%)*	*Trace*	*Trace (99%)*
Sub-Sample Period: 15/12/95-30/6/97 (Pre-Crisis Flexible-Exchange Regime)				
$r = 0$	38.98*	23.98	45.84*	31.15
$r \leq 1$	6.86	16.55	6.86	16.55
Sub-Sample Period: 1/7/97-1/9/98 (During-Crisis Flexible-Exchange Regime)				
$r = 0$	29.04*	23.98	33.94*	31.15
$r \leq 1$	4.90	16.55	4.90	16.55
Sub- Sample Period: 2/9/98-21/7/2005 (After Crisis Fixed-Exchange Regime)				
$r = 0$	205.34*	23.98	214.67*	31.15
$r \leq 1$	9.33	16.55	9.33	16.55

Notes: *r* indicates the number of cointegrating vectors. The asterisk (*) indicates rejection of null hypothesis at 99 percent significance level.

at the level or first difference of the data. The presence of a unique cointegrating vector, as for all the three sub-sample periods, will furnish us with one error-correction term for constructing the VECM. Table 3 reports the *p* values for the Wald test of each sub-sample period of the null hypothesis that the lagged values of coefficient of a given variable in each equation are jointly zero. We reject the null hypothesis that one variable does not cause another variable in Granger sense if the test statistic is greater than the critical values for F variable at *p* significance level. For the sub-sample period of pre-crisis Flexible-Exchange Regime, the result shows that only the KLSE CI does "Granger" cause the KLSE CI Futures. Clearly, this result is consistent with the findings of Subrahmanyam (1991) and Chan (1992) that if an informed trader had specific firm-related information, it might be optimal to trade the shares of the firm directly rather than to trade the index futures. Thus, for some types of information, the transmission of information might flow from the spot to the futures market. Another possible reason for this finding is that there were still no active program trading and portfolio insurance activities in Malaysia at the early stage of the futures trading, which officially embarked trading in December 1995. There is one significant error correction term (ECT) in the Δ KLSE CI. This suggests that Δ KLSE CI variable does have short-run adjustment to long-run equilibrium.

The result for the sub-sample period of during-crisis Flexible-Exchange Regime shows that only the Kuala Lumpur Stock Exchange Composite Index Futures does "Granger" cause the KLSE CI Index. This finding is consistent with that of many other researchers that the movements in the futures markets lead the stock index movements. There is one significant error correction term (ECT) in the Δ KLSE CI. This suggests that Δ KLSE CI variable does have short-run adjustment to long-run equilibrium. Under the sub-sample period of after-crisis Fixed-Exchange Regime, the result shows that again, only the KLSE CI does "Granger" cause the KLSE CI Futures. There are two significant error correction terms (ECTs) in the Δ KLSE CI and Δ KLSE CI Futures. This suggests that Δ KLSE CI and Δ KLSE CI Futures variables do have short-run adjustments to long-run equilibrium.

Table 3
Granger Causality Results based on Vector Error-Correction Model

Optimal lag length=2, Number of Cointegrating Equations=1 and Deterministic Trend in VAR

Dependent Variables	ΔKLSE CI FUTURES	ΔKLSE CI	ECT_{t-1} t-statistics
Sub-Sample Period: 15/12/95-30/6/97 (Pre-Crisis Flexible-Exchange Regime)			
Dependent Variables	ΔKLSE CI FUTURES	ΔKLSE CI	ECT_{t-1} t-statistics
	F-Statistics (Significance Level)		
Δ KLSE CI FUTURES	1.0061	4.6071	-0.0580
	(0.3165)	(0.0325)**	
Δ KLSE CI	0.2046	0.8517	0.1807**
	(0.6513)	(0.3567)	
Sub-Sample Period: 1/7/97-1/9/98 (During-Crisis Flexible-Exchange Regime)			
Dependent Variables	ΔKLSE CI FUTURES	ΔKLSE CI	ECT_{t-1} t-statistics
	F-Statistics (Significance Level)		
Δ KLSE CI FUTURES	2.5827	2.0360	-0.2483**
	(0.1091)	(0.1547)	
Δ KLSE CI	14.1059	5.4551	0.0198
	(0.0002)***	(0.0202)**	
Sub-Sample Period: 2/9/98-21/7/2005 (After-Crisis Fixed-Exchange Regime)			
Dependent Variables	ΔKLSE CI FUTURES	ΔKLSE CI	ECT_{t-1} t-statistics
	F-Statistics (Significance Level)		
Δ KLSE CI FUTURES	15.8030	8.2343	-0.1284***
	(0.0001)***	(0.0042)***	
Δ KLSE CI	1.8362	4.3094	0.1193***
	(0.1756)	(0.0381)**	

Notes: The F-statistics test the joint significance of the lagged values of the independent variables, and t-statistics test the significance of the error correction term (ECT). The asterisks indicate the following levels of significance: ***1 percent and **5 percent.

4. CONCLUSIONS

This study investigates the extent of the interactions and linkages between the KLSE CI and the KLSE CI Futures in three sub-sample periods, namely, Pre-Crisis Flexible-Exchange Regime, During-Crisis Flexible-Exchange Regime and After-Crisis Fixed-Exchange Regime. The Johansen-Juselius Cointegration test shows that the KLSE CI and KLSE CI Futures are cointegrated. This implies that there exists a long-run equilibrium relationship between the KLSE CI and KLSE CI Futures for the three sub-sample periods. By employing Vector Error Correction Model (VECM), there is an evidence of long run causality between KLSE CI and KLSE CI Futures because the coefficients of error correction term are statistically significant for the three sub-sample periods. The results of the Granger causality show that in the first sub-sample period, only the Kuala Lumpur Stock Exchange Composite Index "Granger" causes the KLSE CI Futures. This result is consistent with the findings of Subrahmanyam (1991) and Chan (1992) that if an informed trader had specific firm-related information, it might be optimal to trade the shares of the firm directly rather than to trade the index futures. Thus, for some types of information, the transmission of information might flow from the spot to the futures market. Another possible reason for this finding is that there were still no active program trading and portfolio insurance activities in Malaysia at the early stage of the futures trading, which only officially embarked trading in December 1995. In the second sub-sample period, however, the results show that only the KLSE CI Futures "Granger" causes the KLSE CI, which implies that KLSE CI Futures has some predictive power for the KLSE CI. This finding is consistent with that of many other researchers that the movements in the futures markets lead the stock index movements. The existence of this relationship between the two markets can lead investors to take advantage of hedging and arbitrage opportunities (Kenourgios D. F., 2004).

Following the pegging of RM to USD at a fixed rate of 3.80 under the capital control package implemented by the government on 2nd September 1998 with the purposes of combating the speculation on the foreign exchange and stabilising the economy, the results in the third sub-sample period show that only the KLSE CI "Granger" causes the KLSE CI Futures. Under such capital control period, the stock market in Malaysia was more actively traded as compared to futures market and the flow of information was from cash market to futures market.

References

Athanasios, V. (2010), "Lead-Lag Relationship between Futures Market and Spot Market. Evidence from Greek Stock and Derivatives Markets", *International Research Journal of Finance and Economics,* No. 41, July, pp 163-176.

Chan, K. (1992), "A Further Analysis of the Lead-Lag Relationship between the Cash Market and Stock Index Futures Markets", *Review of Financial Studies*, Vol. 5, No. 1, pp 123-152.

Chan, K., Chan, K.C. and Karolyi, G.A. (1991), "Intraday Volatility In the Stock Index and Stock Index Futures Markets", *Review of Financial Studies*, Vol. 4, No. 4, pp 657-683.

Edwards, F.R. (1988), "Does Futures Trading Increase Stock Market Volatility?" *Financial Analysis Journal*, Vol. 44, No. 1, pp 63-69.

Engle, R.F. and Granger, C.W.J. (1987), "Cointegration and Error Correction Representation, Estimation, and Testing", *Econometrica*, Vol. 55, No. 2, pp 251-276.

Finnerty, J.E. and Park, H.Y (1987), "Stock Index Futures: Does the Tail Wag the Dog? A Technical Note", *Financial Analysts Journal*, Vol. 43, No. 2, pp 57-61.

Granger, C.W.J. (1986), "Development in the Study of Cointegrated Economic Variables", *Oxford Bulletin of Economics and Statistics*, Vol. 48, No. 3, pp 213-228.

Harris, L. (1989), "The October 1987 S&P500 Stock-Futures Basis", *Journal of Finance*, Vol. 44, No. 1, pp 77-99.

Hung, M.W. and Zhang, H. (1995), "Price Movements and Price Discovery in the Municipal Bond Index and the Index Futures Markets", *Journal of Futures Markets*, Vol. 15, No. 4, pp 489-506.

Johansen, S. (1988), "Statistical Analysis of Cointegration Vectors", *Journal of Economic Dynamic and Control*, Vol. 12, No. 2-3, pp 231-254.

Johansen, S. and Juselius, K. (1990), "Maximum Likelihood Estimation and Inference on Cointegration – with Application to the Demand for Money" *Oxford Bulletin of Economics and Statistical*, Vol. 52, No. 2, pp 169-210.

Kawaller, I.G., Koch, P.D. and Koch, T.W. (1987), "The Temporal Price Relationship between S&P500 Futures and the S&P500 Index", *Journal of Finance*, Vol. 42, No. 5, pp 1309-1329.

Kenourgios, D.F. (2004), "Price discovery in the Athens Derivatives Exchange: Evidence for the FTSE/ASE-20 futures market", *Economic and Business Review*, Vol. 6(3), pp. 229-243.

KLSE (Kuala Lumpur Stock Exchange) (1996), *Information Book*, Kuala Lumpur: Kuala Lumpur Stock Exchange.

Ng, N. (1987), "Detecting Spot Price Forecasts in Futures Prices Using Causality Test", *Review of Futures Markets*, Vol. 16, No. 4, pp 250-267.

Sims, C.A. (1980), "Macroeconomics and Reality", *Econometrica*, Vol. 48, No.1, pp 1-48.

Stoll, H.R. and Whalley, R.E. (1990), "The Dynamics of Stock Index and Stock Index Futures Returns,' *Journal of Financial and Quantitative Analysis"*, Vol. 25, No. 3, pp 41-48.

Subrahmanyam, A. (1991), "A Theory of Trading in Stock Index Futures", *Review of Financial Studies*, Vol. 4, No. 1, pp 17-71.

Wang, H.K. and Yau, J. (1994), "A Time Series Approach to Testing for Market Linkage: Unit Root and Cointegration Tests", *Journal of Futures Markets*, Vol. 14, No. 4, pp 457-474.

Wikipedia (2014), "1997 Asian Financial Crisis", [online], *http://en.wikipedia.org/wiki/1997_Asian_financial crisis.*