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PREFERENCES ON INVESTING IN MALAYSIAN STOCKS AND FUTURES MARKETS

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This paper investigates the preference of spot and futures markets in Malaysia for risk averters and risk seekers. The stochastic dominance approach is employed to perform the empirical analysis. It is observed that spot is preferred to futures at the downside risk whereas futures is preferred to spot at the upside profits for the entire period as well as all sub-periods. Spot dominates futures for risk averters while futures dominate spot for risk seekers. The preference of spot and futures markets for both risk averters and risk seekers are robust to crisis. In addition, the results support efficiency of both markets. In addition, several positive measures imposed by the government play a big role in stabilising the economy and sustain financial markets.

Keywords: stochastic dominance, futures, Malaysia, market efficiency

INTRODUCTION

Futures are derivatives of spot assets and futures' trading plays the role of price discovery. According to Floros and Vougas (2008), and Pok (2008) the futures market reflects new information before the spot market does and futures prices response quicker than spot prices when there is new information. Chen and Zheng (2008) support the argument that future prices are naturally highly related to spot prices.

Many researchers, for example, Stoll and Whaley (1990), and Tse (1995), claim that futures market has a stronger lead effect on spot index. Moreover, Kuiper, Pennings and Meulenberg (2002) show that spot price not just lead by the futures price, but fully adjust to the changes in the futures price. Hence, investors are able to transmit the futures price changes into the spot price. This means that futures price is not only the reference price in the long run, but also represent the changes of price over a large time interval.

In the case of Malaysia, Lean, Lien and Wong (2010) examine the relationship between spot and futures markets by employing stochastic dominance (SD) approach. They find that spot dominates futures on the downside risk whereas futures dominate spot on the upside profits. Findings also show that risk-averse investors prefer to buy indexed stocks, while risk-seekers are attracted to long index futures to maximise their expected utility.

This paper extends from Lean, Lien and Wong's (2010) work by investigating the preferences of investing in spot and futures markets for risk-averse and risk-seeking investors in Malaysia. A value added to this paper is that I use the multiple structural breaks test as proposed by Bai and Perron (1998; 2003) in the analysis. The full sample period is divided into a few sub-periods endogenously based on the breaks dates that are found from the multiple structural breaks test. The endogenous structural breaks coincide with major events such as the Asian financial crisis, dot com bubble and sub-prime crisis which will provide relevancy in the examination of persistency and sustainability of these markets.

The efficiency of a market can be inferred as effective information transmission. Financial derivatives including futures can increase stock market efficiency which means effective information transmission is important. Information efficiency leads to economic efficiency which enhances economic development and sustainability.

This paper is organised as follows: literature on the relationships of spot and futures markets, and SD is reviewed in the next section. Section 3 provides the description of the data and methodologies that are employed in the study. Section 4 discusses the empirical findings and the final section concludes.

LITERATURE REVIEW

According to Ozun and Erbaykal (2009), there is unidirectional causality runs from futures market to spot market. Pok (2008) discloses that there is no significant long-run relationship between stocks and futures, whereas futures lead spot in the short run. In contrast, Maslyuk and Smyth (2009) argue that there is a significant long-run relationship between spot prices and futures prices but not in the short-run. In the short-run, there might be deviations in spot price and futures price due to thin trading, lags in information transmission, insufficient inventory level and seasonal patterns of consumption.

Herbst, McCormarck and West (1987) also show that futures prices tend to lead spot prices in the long-run than the short-run. However, the lead is unlikely to provide any profitable advantage unless it can react appropriately and promptly. Previous research tests the relationship between spot and futures returns in a linear structure. Some researchers reveal that there is nonlinear structure in the relationship between spot and futures returns and the nonlinear effect may change the pattern of leads and lags over time.

As the futures market affects the price behaviour in stock market, futures market is able to fulfill its function in directing the spot market (Floros and Vougas, 2008; Ozun and Erbaykal, 2009). Liu et al. (2008) and Floros and Vougas (2008) document that futures and spot markets move in the same direction and in a very close range. In Malaysia, Pok (2008) reports that the price discovery in futures trading is influenced by the changes in the composition of market agents. An investor may trade in futures market instead of stock market when there is new information from the futures market to stock market (Chen and Zheng, 2008). Nonetheless, Villiers (1999) argues that the relationship between futures and spot prices depends on interest rates, storage costs, dividend payment and convenience yields in a perfect market. Any influence in these factors may provide riskless return to the investors.

Some researchers argue that futures price cannot provide a reliable forecast for stock price unless there is a large variance in the expected spot price change (Kenneth, 1986). In stable markets, futures tend to lead the stock market but there is a bidirectional relationship between the two markets in highly volatile markets (Mahdhir et al., 2002). By using high-frequency intraday data of spot and futures contracts in Korea, Kang, Cheong and Yoon (2013) established a strong bi-directional causal relationship between the two markets. This finding suggests that return volatility in the spot market can influence the return utility in the futures market and vice versa.

There are various studies that investigated the effect of futures trading on the volatility of the underlying spot market (Brown-Hruska and Kuserk, 1995; Kyriacou and Sarno, 1999). Bae, Kwon and Park (2004) posit that futures' trading increases the volatility of spot prices in Korea. Investigating the effects of returns and volatility on the Malaysian market, Pok and Poshakwale (2004) find that futures' trading increases the spot market's volatility. The above studies show that the effect of futures trading on the volatility of spot markets varies in different time periods and depends on the model specifications and the countries examined.

Maslyuk and Smyth (2009) claim that if two markets are cointegrated, the prices may combine and the predictability of one market can be enhanced through information contained in another market. In addition, Liu et al. (2008) clarify that enhancing the development of futures market in emerging markets can help to ensure the stability and efficient resource allocation of the spot market. Independent of one's specific preference, if an investor switches his/her asset choice and increases his/her wealth, then, the market data show that investors can benefit and the market can be sustained.

Conceptually, market rationality within the SD framework has no difference from the conventional models. The conventional approach defines an abnormal return as an excess return adjusted to some risk measures while SD approach examines the whole distribution of returns. The advantages of using SD approach over the conventional approach such as mean-variance (MV) criterion and Capital Asset Pricing Model (CAPM) statistics have been well discussed in Chiang, Lean and Wong (2009) and the references therein. Given the imprecise knowledge of the best model, the SD approach with fewer restrictions on investor's preferences and return distributions may help to understand the markets better.

Several researches, for example, Brooks, Levy and Yoder (1987), adopt SD to evaluate the performance of portfolios containing derivatives. In addition, Bookstaber and Clarke (1985) point out that when evaluating portfolios that include options, MV rules are not applicable because the normality assumption is violated. Booth, Tehranian and Trennepohl (1985) show that SD rules are appropriate in ranking portfolios that contain options and other assets. Trennepohl, Booth and Tehranian (1988) state that portfolios insured with options stochastically dominate uninsured assets. Brooks (1989; 1991) apply SD to compare various trading strategies for index options. Conover and Dubofsky (1995) examine similar issues on currency markets. They find that protective puts using futures options are dominated by both protective puts that use options on spot currencies and by fiduciary calls on futures contracts. Bhargava and Brooks (2002) illustrate the use of SD and expected utility in selecting appropriate hedging strategies. They find that different sets of expectations lead to different optimal hedging strategies.

DATA AND METHODOLOGY

This study uses daily spot (Kuala Lumpur Composite Index, KLCI) and futures (Bursa Malaysia KLCI Futures, FKLI) indices for the period from 15 December 1995 (the date FKLI was launched) to 30 September 2010. The daily closing prices of the KLCI were collected from Datastream, while the daily closing prices of FKLI for the spot month contracts were obtained from the Bursa Malaysia Derivatives Berhad's website. The daily log returns, $R_{i,t}$, for both spot and futures indices, $R_{i,t} = ln\ (P_{i,t} / P_{i,t\text{-}1})$, where $P_{i,t}$ is the daily index at day t for index i with $i = S$ (Spot) and F (Futures), respectively. The 3-month U.S. T-bill rate and the Morgan Stanley Capital International index (MSCI) returns are used as the proxy for the risk-free rate, R_f, and the global market index, R_m, respectively, for the CAPM statistics computation.

First, Bai and Perron's (1998; 2003) procedure is employed to detect the existence of endogenous multiple breaks in the time series of KLCI and FKLI. The entire full sample period is divided into several sub-periods based on the breaks points found. The key idea for obtaining the multiple structural breaks is to determine the number and locations of breaks in a linear regression model.

Suppose there are m multiple structural breaks ($n_1 \ldots n_m$) in the time-path of the variable being studied. The determination of structural breaks is to find the break points ($\check{n}_{1 \ldots}\check{n}_m$) that minimise the objective function ($\check{n}_{1 \ldots}\ \check{n}_m$) = arg min ($n_1 \ldots n_m$) RSS_n ($n_{1,\ldots}\ n_m$) where RSS_n is the resulting residual sum of squares from the m linear regressions of $y_t = \beta x_t^T + \varepsilon_t$, (t =1… n) where y_t is the dependent variable at time t, $x_t = (1, y_{t-1})^T$ is the (2 × 1) vector of observations of the independent variables with the first component equal to unity, β is a vector of the regression coefficients, and ε_t is assumed to be independent and identically distributed with mean 0 and variance σ^2.

Based on Bai and Perron's (1998; 2003) procedure, four breaks dates were identified: 4 March 1998, 23 May 2000, 6 January 2004 and 23 November 2006. Hence, this study has five sub-periods: sub-period 1 from 15 December 1995 to 4 March 1998, sub-period 2 from 5 March 1998 to 23 May 2000, sub-period 3 from 24 May 2000 to 6 January 2004, sub-period 4 from 7 January 2004 to 23 November 2006, and sub-period 5 from 24 November 2006 to 30 September 2010. Figure 1 depicts the time series plots for both indices.

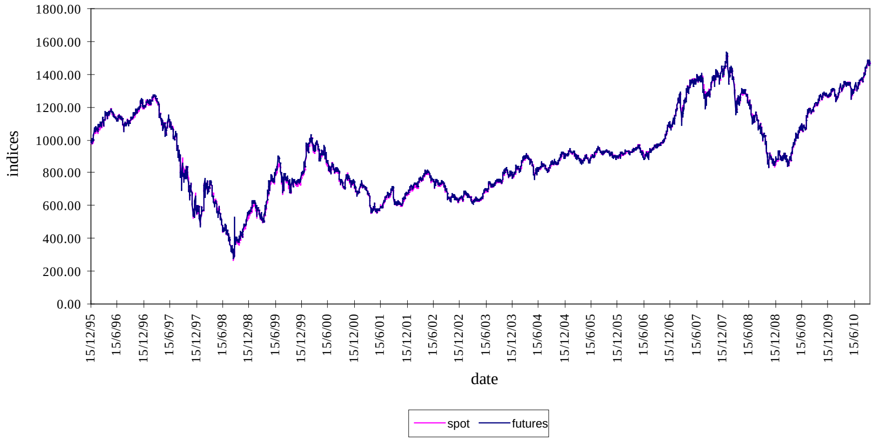

Figure 1: Time series plot for stock and futures indices.

MV and CAPM

MV criterion and CAPM statistics are commonly used for constructing efficient portfolio and evaluation of investment performance in the modern finance. Assuming there are two returns Y_i and Y_j with means μ_i and μ_j and standard deviations σ_i and σ_j respectively, Y_j dominates Y_i by the MV rule if $\mu_j \geq \mu_i$ and $\sigma_j \leq \sigma_i$ (Markowitz, 1952; Tobin, 1958). On the other hand, CAPM statistics includes the beta, Sharpe ratio, Treynor's index and Jensen index (alpha) to measure performance. Readers may refer to Sharpe (1964), Treynor (1965) and Jensen (1969) for details on the definitions of these statistics.

Stochastic Dominance Approach

Hadar and Russell (1969) and Hanoch and Levy (1969) laid the foundation of SD analysis. This approach is superior to both MV approach and CAPM statistics because it requires minimum assumptions on the investor's utility function and studies the entire distribution of returns directly. In addition, the SD rules could be used to draw preferences for risk averters as well as risk seekers on their investments.

The SD approach has been employed in many studies since 1970s to analyse many financial puzzles. SD statistical tests for risk averters are well developed in studies by Davidson and Duclos (2000), Barrett and Donald (2003), Linton, Maasoumi and Whang (2005) and others. Sriboonchita et al. (2009) and Lean, Lien and Wong (2010) modify the SD tests for risk averters to be SD tests for risk seekers.

Let F and G be the cumulative distribution functions (CDFs) of two prospects X and Y, respectively, supported by [a, b]. For j = 1,2,3, define:

$$H_j^A(x) = \int_a^x H_{j-1}^A(t)\,dt \text{ and } H_j^D(x) = \int_x^b H_{j-1}^D(t)\,dt \text{ for } H = F,G \tag{1}$$

The integral H_j^A is called the j^{th} order ascending cumulative distribution function (ACDF), and the integral H_j^D is called the j^{th} order descending cumulative distribution function (DCDF). The most commonly used SD rules correspond with three broadly defined utility functions: first-, second-, and third-order ascending stochastic dominance (ASD) for the risk-averters, and descending stochastic dominance (DSD) for risk-seekers. SD is defined as follows (Quirk and Saposnik, 1962; Levy and Wiener, 1998):

Definition 1:

X dominates Y by FASD (SASD, TASD), denoted by $X \succ_1 Y$ or $F \succ_1 G$ ($X \succ_2 Y$ or $F \succ_2$ G, $X \succ_3 Y$ or $F \succ_3$ G) if and only if $F_1^A(x) \le G_1^A(x)$ $(F_2^A(x) \le G_2^A(x), (F_3^A(x) \le G_3^A(x))$ for all possible x; and the strict inequality holds for at least one x; where FASD (SASD,

Definition 2:

X dominates Y by FDSD (SASD, TDSD), denoted by $X \succ^1 Y$ or $F \succ^1 G$ ($X \succ^2 Y$ or $F \succ^2$ G, $X \succ^3 Y$ or $F \succ^3 G$) if and only if $F_1^D(x) \ge G_1^D(x)$ $(F_2^D(x) \ge G_2^D(x), (F_3^D(x) \ge G_3^D(x))$ for all possible x; and the strict inequality holds for at least one x; where FDSD (SDSD, TDSD) stands for first-(second-, third-) order DSD.

Investigating the SD relationship among different prospects is equivalent to examining the choice of prospects by utility maximisation under the SD theory. The existence of SD implies that the investor's instead of the dominated asset. For instance, the dominance of *X* over *Y* by FASD (SASD, TASD) is equivalent to the preference of *X* over *Y* by the first- (second-, third-) order risk averters. The dominance of *X* over *Y* by FDSD (SDSD, TDSD) is equivalent to the preference of *X* over *Y* by the first- (second-, third-) order risk seekers (Li and Wong, 1999). The hierarchical relationship exists in SD: first-order SD implies second-order SD, which in turn implies third-order SD. However, the converse is not true. Thus, only the lowest dominance order of SD is reported (Wong, Phoon and Lean, 2008).

Davidson and Duclos (DD) Test

Let $\{(f_i, s_i)\}$ be pairs of observations drawn from futures and spot indices with CDFs *F* and *G* respectively. For a grid of pre-selected points $x_1, x_2 ... x_{k,}$ the j^{th} order DD test statistic for the risk averters, T_j^A (*j* = 1, 2 and 3), is:

$$T_j^A(x) = \frac{\hat{F}_j^A(x) - \hat{G}_j^A(x)}{\sqrt{\hat{V}_j^A(x)}} \tag{2}$$

Where

$$\hat{V}_j^A(x) = \hat{V}_{F_j}^A(x) + \hat{V}_{G_j}^A(x) - 2\hat{V}_{FG_j}^A(x), \quad \hat{H}_j^A(x) = \frac{1}{N(j-1)!}\sum_{i=1}^{N}(x - z_i)_+^{j-1},$$

$$\hat{V}_{H_j}^A(x) = \frac{1}{N}\left[\frac{1}{N((j-1)!)^2}\sum_{i=1}^{N}(x - z_i)_+^{2(j-1)} - \hat{H}_j^A(x)^2\right], H = F, G; z = f, s;$$

$$\hat{V}_{FG_j}^A(x) = \frac{1}{N}\left[\frac{1}{N((j-1)!)^2}\sum_{i=1}^{N}(x - f_i)_+^{j-1}\left(x - s_i\right)_+^{j-1} - \hat{F}_j^A(x)\hat{G}_j^A(x)\right];$$

in which the integrals F_j^A and G_j^A are defined in (1) for $j = 1, 2, 3$.

It is empirically impossible to test the null hypothesis for the full support of the distributions. Thus, Bishop, Formly and Thistle (1992) propose to test the null hypothesis for a pre-designed finite numbers of values *x*. Under the null hypothesis, DD shows that T_j^A is asymptotically distributed as the Studentized Maximum Modulus (SMM) distribution (Richmond, 1982). To implement the DD test, the null hypothesis is rejected if T_j^A is significant at any grid point.

The DD test compares the distributions at a finite number of grid points. Too few grids will miss the information in the distributions between any two consecutive grids (Barrett and Donald, 2003), and too many grids will violate the independence assumption required by the SMM distribution (Richmond, 1982). To make more detailed comparisons without violating the independence assumption, Lean, Smyth and Wong (2007) and Wong, Phoon and Lean (2008) suggest that 10 major partitions with 10 minor partitions are made within any two consecutive major partitions in each comparison.[1]

Following Lean, Lien and Wong (2010), the j^{th} order DD test statistic for risk seekers (j = 1, 2 and 3) is:

$$T_j^D(x) = \frac{\hat{F}_j^D(x) - \hat{G}_j^D(x)}{\sqrt{\hat{V}_j^D(x)}} \tag{3}$$

Where

$$\hat{V}_j^D(x) = \hat{V}_{F_j}^D(x) + \hat{V}_{G_j}^D(x) - 2\hat{V}_{FG_j}^D(x), \quad \hat{H}_j^D(x) = \frac{1}{N(j-1)!}\sum_{i=1}^{N}(z_i - x)_+^{j-1},$$

$$\hat{V}_{Hj}^D(x) = \frac{1}{N}\left[\frac{1}{N((j-1)!)^2}\sum_{i=1}^{N}(z_i - x)_+^{2(j-1)} - \hat{H}_j^D(x)^2\right], H = F, G; z = f, s;$$

$$\hat{V}_{FG_j}^D(x) = \frac{1}{N}\left[\frac{1}{N((j-1)!)^2}\sum_{i=1}^{N}(f_i - x)_+^{j-1}(s_i - x)_+^{j-1} - \hat{F}_j^D(x)\hat{G}_j^D(x)\right];$$

in which the integrals $F_j^D(x)$ and $G_j^D(x)$ are defined in (1) for $j = 1, 2, 3$.

EMPIRICAL RESULTS

Results for the Full Sample Period

Table 1 displays the results of descriptive statistics for the daily returns of KLCI (spot) and FKLI (futures) respectively for the full sample period. It shows that both mean returns of KLCI and FKLI are about the same positive values and, as expected, their difference is insignificantly different from zero. On the other hand, the standard deviation of KLCI is lower than that of FKLI and, their ratio is not significantly different from unity. Thus, the MV criterion does not indicate any preference between these two indices. In addition, both indices have about similar values of Sharpe ratios, Treynor indices, and Jensen indices respectively; with their differences to be insignificantly different from zero. Thus, the results of the CAPM statistics did not reveal any preference between KLCI and FKLI.

Table 1: Descriptive statistics of daily stocks and futures returns

	Whole		Sub 1		Sub 2	
Variable	KLCI	FKLI	KLCI	FKLI	KLCI	FKLI
Mean	$1.01^{*}10^{-4}$	$1.01^{*}10^{-4}$	$-5.86^{*}10^{-4}$	$-6.33^{*}10^{-4}$	$4.52^{*}10^{-4}$	$5.19^{*}10^{-4}$
Std Dev	0.0147	0.0184	0.0204	0.0234	0.0254	0.0335
Skewness	0.4679	–0.9829	2.0505	0.7473	–0.2562	–1.2533
Kurtosis	53.9277	80.5927	27.8916	16.5315	27.8440	44.0947
Jarque-Bera	417175	968688	15327	4463	14897	40893
Sharpe Ratio	–0.0017	–0.0014	–0.0386	–0.0357	0.0102	0.0097
Treynor Index	–0.0001	–0.0001	–0.0013	–0.0010	0.0009	0.0011
Jensen Index	0.0000	0.0000	–0.0011	–0.0013	0.0002	0.0002
N	3859	3859	578	578	579	579
	Sub 3		**Sub 4**		**Sub 5**	
Variable	KLCI	FKLI	KLCI	FKLI	KLCI	FKLI
Mean	$-1.62^{*}10^{-4}$	$-1.66^{*}10^{-4}$	$3.78^{*}10^{-4}$	$3.68^{*}10^{-4}$	$3.34^{*}10^{-4}$	$3.33^{*}10^{-4}$
Std Dev	0.0100	0.0116	0.0056	0.0077	0.0099	0.0127
Skewness	–0.5734	–0.2352	–0.0443	–0.2011	–1.2853	–0.6683
Kurtosis	8.2526	4.9988	5.2978	4.9263	15.0972	6.6460
Jarque-Bera	1138	166	166	121	6405	631
Sharpe Ratio	–0.0267	–0.0234	0.0458	0.0321	0.0268	0.0210
Treynor Index	–0.0071	–0.0016	0.0013	0.0007	0.0011	0.0007
Jensen Index	–0.0003	–0.0002	0.0002	0.0001	0.0003	0.0004
N	945	945	752	752	1005	1005

Note: KLCI represents spot while FKLI represents futures returns.
$^{*}p < 1\%$, $^{**}p < 5\%$, $^{***}p < 10\%$.

Moreover, the highly significant Jarque-Bera statistics for both spot and futures returns show that both returns are non-normal. The daily returns of KLCI are positively skewed, while those of FKLI are negatively skewed. Both indices have higher kurtosis than normality and FKLI has a much higher kurtosis than KLCI. The exhibition of significant skewness and kurtosis further supports the non-normality of the returns distribution, indicating that the normality assumption required by the traditional MV criterion and the CAPM measures is violated.[2]

Table 2: Results of stochastic dominance tests for the risk-averters and risk-seekers

	FASD		SASD		TASD	
	$\%T_1^A > 0$	$\%T_1^A < 0$	$\%T_2^A > 0$	$\%T_2^A < 0$	$\%T_3^A > 0$	$\%T_3^A < 0$
Whole Period	8	7	9	0	11	0
Sub 1	3	2	12	0	15	0
Sub 2	4	6	7	0	0	0
Sub 3	13	11	22	0	25	0
Sub 4	25	20	37	0	56	0
Sub 5	17	18	21	0	28	0
	FDSD		SDSD		TDSD	
	$\%T_1^D > 0$	$\%T_1^D < 0$	$\%T_2^D > 0$	$\%T_2^D < 0$	$\%T_3^D > 0$	$\%T_3^D < 0$
Whole Period	7	8	9	0	16	0
Sub 1	2	3	6	0	0	0
Sub 2	6	4	8	0	0	0
Sub 3	11	13	24	0	34	0
Sub 4	20	25	33	0	53	0
Sub 5	18	17	25	0	45	0

Note: DD test statistics, T_j^A (j = 1, 2, 3), for the risk-averters and T_j^D (j = 1, 2, 3), for risk-seekers are computed over a grid of 100 on the range of the empirical distributions of KLCI (spot) and FKLI (futures) returns. Refer to (2) and (3) for the definitions of T_j^A and T_j^D, respectively, with F representing FKLI (futures) and G representing KLCI (spot). The table reports the percentage of DD statistics that are significantly negative or positive at the 5% significance level, based on the bootstrap critical value. Readers may refer to Definition 1 for FASD, SASD, and TASD and refer to Definition 2 for FDSD, SDSD, and TDSD.

Table 2 displays the results of DD test to compare the preference of KLCI and FKLI. It is found that 8% (7%) of T_1^A is significantly positive (negative) for the full sample period. The hypothesis that FKLI stochastically dominates KLCI or vice versa at the first order is, thus, rejected. Together with the plot of the ASD test exhibited in Figure 2, the results from Table 2 show that T_1^A is significantly positive at the downside risk and significantly negative at the upside profit, inferring that KLCI is preferred to FKLI on the downside risk and FKLI is preferred on the upside profits. However, these results do not reject market efficiency.

In addition, Table 2 shows that 7% (8%) of T_1^D is significantly positive (negative), implying no dominance in FDSD. Together with the plot of the DSD test displayed in Figure 3, the results from Table 2 reveal that T_1^D is significantly negative at the downside risk and significantly positive at the upside profit. Results of DSD draw the same inference as ASD.

From Table 2, it is observed that 9% (11%) of $T_2^A\left(T_3^A\right)$ is significantly positive and no second-order (third-order) DD statistic is significantly negative at the 5% critical level. Hence, there is a dominance of KLCI over FKLI in terms of SASD (TASD) inferring that risk averters prefer to invest in spot to futures. On the other hand, 9% of T_2^D is significantly positive and no T_2^D is significantly negative at the 5% critical level. This implies that risk seekers prefer FKLI to KLCI in SDSD for the whole sample period. The results for TDSD can be drawn in the same way. Different from the conclusion drawn in the ASD test, the evidence from the DSD test shows that risk seekers are attracted to the futures index to maximise their expected utility. Therefore, risk averters prefer to invest in spot while risk seekers prefer to invest in futures and Malaysia's spot and futures markets are efficient.

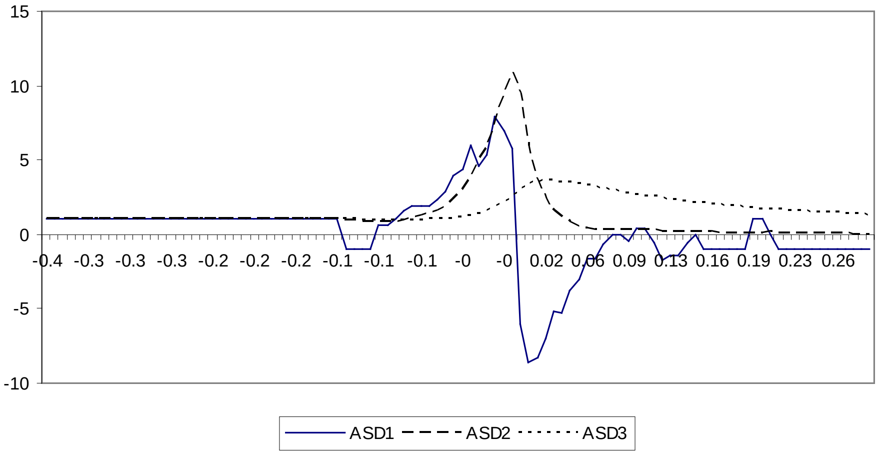

Figure 2: Ascending stochastic dominance for the entire period.

Note: ASDj represents T_j^A for j = 1, 2, 3. Readers may refer to (2) for the definition of T_j^A with F representing FKLI (futures) and G representing KLCI (spot).

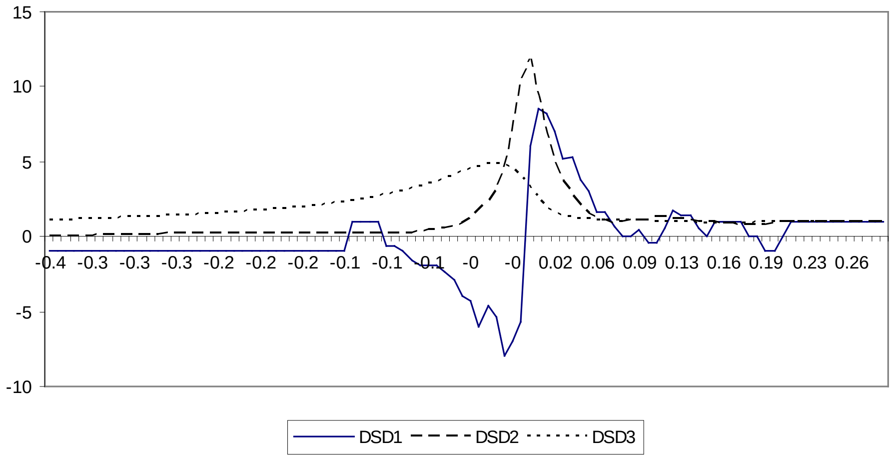

Figure 3: Descending stochastic dominance for the whole period.

Note: DSDj represents T_j^D (j = 1, 2, 3). Readers may refer to (3) for the definition of T_j^D with F representing FKLI (futures) and G representing KLCI (spot).

Results for Sub-Periods

The descriptive statistics for each pair of spot and futures in each sub-period are summarised in Table 1. Table 1 shows that both mean of daily returns for KLCI and FKLI are negative in the sub-periods1 and 3 but become positive in the sub-periods 2, 4, and 5. In sub-period 2, the mean returns are the highest for both spot and futures indices. The standard deviations for FKLI are bigger than the KLCI in all sub-periods. Again, the MV criterion could not reveal any preference between spot and futures in each sub-period. On the other hand, the three CAPM statistics are negative in the sub-periods 1 and 3 and become positive in the sub-periods 2, 4, and 5. However, similar to the findings from the full sample period, none of these three CAPM statistics indicates any preference between KLCI and FKLI for all sub-periods.

Similar to the ASD results for the full sample period, results for the sub-periods also reject the hypothesis that FKLI stochastically dominates KLCI or vice versa at the first order. But, the percentages of ASD dominance are increasing. Again, T_1^A is significantly positive at the downside risk and significantly negative at the upside profit, inferring that KLCI is preferred to FKLI at the downside risk and FKLI is preferred at the upside profits.

Table 2 indicates that 2%, 6%, 11%, 20%, and 18% of T_1^D are significantly positive whereas 3%, 4%, 13%, 25%, and 17% of T_1^D are significantly negative for the 1st, 2nd, 3rd, 4th and 5th sub-periods, implying no dominance in FDSD. T_1^D is significantly negative at the downside risk and significantly positive at the upside profit. This result draws the same inference as the above that KLCI is preferred to FKLI at the downside risk and FKLI is preferred at the upside profits for all sub-periods. Hence, risk-averse investors would prefer the spot index whereas risk seekers prefer futures index in all sub-periods but do not reject market efficiency hypothesis.

On the other hand, a dominance of KLCI over FKLI is exhibited in terms of SASD and TASD and a reverse dominance in terms of SDSD and TDSD for all sub-periods. This implies that risk-averse investors would prefer the spot index whereas risk seekers prefer futures index in all sub-periods. However, there is a stronger evidence of SD for both risk averters and risk seekers in the sub-periods 3, 4, and 5 than the 1st and 2nd sub-periods. This implies that risk-averse investors strongly prefer KLCI to FKLI, whereas risk seekers strongly prefer FKLI over KLCI after May 2000. The results may suggest that investors had gained more confidence in the Malaysian financial markets after several positive measures were adopted to tackle the Asian financial crisis.

In short, this study concludes that the preference of spots and futures markets for both risk averters and risk seekers are robust to crisis. In addition, the results support efficiency of both markets. The measures taken by the government were positive as they managed to stabilise the economy and sustain the financial markets.

CONCLUSION

This paper examines the preferences of risk-averse and risk-seeking investors on investing in spot and futures markets in Malaysia. It is found that risk-averse (risk-seeking) investors will increase their expected utility but not necessarily their wealth by switching from futures (spot) to the spot (futures). Nevertheless, the existence of the second- and third-order SD does not imply the existence of any arbitrage opportunity or the failure of market efficiency regardless of the time periods. Therefore, it is concluded that although the spot index does not outperform the futures index or vice-versa from a wealth perspective, risk-averse investors prefer to invest in the spot to futures market whereas risk-seeking investors prefer to invest in futures to spot market, in order to increase their expected utility.

In equilibrium, the number of trade that risk averters buy spot and/or short selling futures matches with the number of trade that risk seekers buy futures and/or short selling spot. In this situation, there is no pressure to push up or down neither the price of spot nor futures while both risk averters and risk seekers can still obtain what they desire. Under this circumstance, the market is still efficient and investors are still rational.

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NOTES

1. Refer to Lean, Wong and Zhang (2008) for the reasoning.
2. Both series are I(1) based on the unreported ADF unit root test.

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