TERM SPREAD AND STOCK MARKET RETURNS: THE INFORMATION CONTENT OF THE MALAYSIAN GOVERNMENT SECURITIES YIELDS

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Abstract

The predictive power of term spread, i.e. the difference between long and short term interest rates, is investigated in this study. We propose that the term spread of the Malaysian government securities embodies vital information of future long run movement of stock returns. Our results indicate that the Malaysian term spread is useful in signaling the long run direction of Malaysian stock returns. The moving average series of four major Kuala Lumpur Stock Exchange (KLSE) indices; the Composite Index, Industrial Index, Finance Index, and Property Index, are shown to be significantly affected by lagged term spread up to about six months. Nevertheless, term spread is not a significant factor that drives short run movement in stock prices. Our results are strengthened by the evidence that shows the uniqueness of information carries by the term spread. The significance of term spread remains intact even after the effect of monetary is taken into account. The findings add to the list of studies that supports the predictive power of term spread. This evidence of predictive power of term spread in developing financial market such as Malaysia certifies the increased efficiency of securities pricing largely due to the rapid process of development and liberalization that are taking place in Malaysian government securities market since early 1989.

1. INTRODUCTION

The observations that term spread, i.e. the different between long and short term interest rates, inverts prior to business down turn and increasing steadily ahead of expansionary cycle have been documented by various researchers. This stylized fact attracts volumes of studies investigating the information embodied in the term spread. Various measures of term spreads are shown to carry vital information of the future states of key macroeconomic variables such as short term interest rates (Fama (1984), Hardouvelis (1988) and Mishkin (1988)), output (Stock and Watson (1989), Harvey (1991), Sauer and

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Scheide (1995), Dotsey (1998)), inflation (Fama (1990) and Mishkin (1990), and Caparole and Pittis (1998) and consumption measures (Harvey (1988) and Estrella and Hardouvelis (1991) and Strongin (1990).

The findings that term spread possesses vital information is critical for those interested in gauging future economic condition. Public and private policy makers decide on today's policies subject to current and expected economic conditions. Monetary authorities greatly rely on the future economic outlook in setting current policy. Step a head decisions, prior to the turning of business cycles allow businesses to adjust their operations to meet expected demand. The ability to accurately forecast future condition of the economy is critical in stocks evaluation. Fundamentally, timing of share purchases or sales requires investors to properly identify major movement that is taking place in the share market. Identification of long run trend generally form the first stage analysis prior to an in-depth industry and stock selections. We add to the above list of supporting evidence by showing that term spread also caries information about future stock market long run movement. We propose that, in a developing country such as Malaysia, where financial market liberalization is rapidly in progress, the government securities term spread is useful in predicting changes in stock prices. Variation in term spread carries vital signal for the long run trend of stock prices but has no significant signal for the short run movement. Positive leading associations of term spread ahead of the long run movement of share prices are significantly supported. We also show that information embodied in the Malaysian government securities term spread is unique in the sense that its predictive power remains even after other indicator (such as monetary growth) is accounted for. Addition of term spread in the list of shares indicators enhanced the ability to predict changes in Malaysian share prices. Evidence that supports the information content of Malaysian government securities yields is also in line with rapid progress of financial market liberalization and development that have taken place in the government securities market since early 1989. Allowing greater role for market forces to be effective in the determination of securities yields results in greater market efficiency with future information being absorbed into current yields. The paper is presented as follow. In Section 2 we describe the theoretical link between the term spread and economic activity based on a two-period consumption allocation model. We also discuss some related findings on the topic in Section 2. Section 3, describes our data set and method of analysis. The results are presented and discussed in Section 4. We end the paper with a brief summary and conclusions.

2. TERM SPREAD AND THE ECONOMY

The link between term spread and economic activity can be described by the consumption-portfolio choice problem faced by an economic agent that lives in an exchange economy. Assume a market

economy composed of individuals that live for two periods with current period denoted as *t*. Each economic agent is endowed with an initial resources, A_t, and faces an inter-temporal allocation problem, i.e. to optimally allocate the amount of consumption and investment in each period. Consumption decision is further complicate by the portfolio decision, i.e. how much to invest in short and long maturity securities. For each economic agent, the maximization problem can be described as strategy to maximize the consumption utility, $V(C_t)$ [1]:

$$\text{Max } V(C_t) = U(C_t) + \theta U(C_{t+1}) + \theta^2 U(C_{t+2}) \quad (1)$$

Subject to the following budget constraint:

$$C_t + B_{1t} + B_{2t} < A_t + B_{1t-1}R_{1t-1} + B_{2t-1}R_{2t-1} \quad (2)$$

Where C_{t+i} is the consumption level in period $t+i$ $(i = 0, 1, 2)$ and θ is the discount factor reflecting subjective rate of time preference , ρ, such that θ is equal to $(1/1 + \rho)$ and assume to be strictly positive. B_{jt} $(j = 1 \text{ and } 2)$ is the amount of short term $(j=1)$ and long term bond $(j=2)$ bought at time *t*. These are risk free government bonds with yield to maturity on the short and long term securities $(R_{1t} \text{ and } R_{2t})$ known at time of purchase. The initial endowment is represented by A_t. The budget constraint indicates that the amount of consumption in each period cannot be more than his initial endowment plus proceed from current value of bonds held. The first order conditions provide the optimal amount of short and long term bonds to be purchased by the individual in order to maximize the consumption utility function:

$$\frac{\partial V}{\partial B_{1t}} = -U'(C_t) + \theta R_{1t}U'(C_{t+1}) \quad (3)$$

$$\frac{\partial V}{\partial B_{2t}} = -U'(C_t) + \theta^2 R_{2t}U'(C_{t+2}) \quad (4)$$

[1] *The model presented is closely related to Haubrich (1999) and Harvey (1997). We extend the model to relate the term spread to economic activity represented by the consumption path. In essence, the model is a simplified variation of consumption-based asset pricing models (eg. Merton (1973), Lucas (1978), Breeden (1979) and Harvey (1988)) that demonstrate theoretical link between term spread and future state of the economy.*

Setting both (3) and (4) equal to zero and after simplification we get:

$$\frac{R_{1t}}{R_{2t}} = \frac{\theta U'(C_{t+2})}{U'(C_{t+1})} \qquad (5)$$

Assuming a logarithmic consumption utility function, *i.e.* $V(C_t) = ln\,(C_t)$, then, it can be shown that the consumption path between consumption in period 1 (C_{t+1}) and period 2 (C_{t+2}) is equal to[2]:

$$C_{t+2} = \frac{R_{2t}}{R_{1t}} C_{t+1} \qquad (6)$$

Accordingly, as shown by equation (6), the level of current term spread dictates the consumption path between period 1 and 2, i.e., a positive term spread ($R_{2t} > R_{1t}$) indicates an upward trend in consumption, a negative term spread ($R_{2t} < R_{1t}$) signals decline in consumption and zero term spread ($R_{1t} = R_{2t}$) indicates unchanged consumption level. Equation (6) can be generalized to overall economic performance. Pattern of consumption which is a major component of real Gross Domestic Products (GDP) reflect the path of real economic activity. Thus, changes in term spread signals future states of the economy.

In line with the above representation, Harvey (1988, 1997) and Stock and Watson (1989) support the role of term spread as leading indicator that signals future economic conditions. Harvey (1988) notes that the real spread, which is the difference between expected real rates of annualized interest between a *j*-quarter maturity and a one-quarter maturity, possesses superior forecasting power in predicting consumption path for the U.S. economy. Harvey (1997) shows that the Canadian bond market contains valuable information about future states of Canadian economy. It is also argued that this information is unique beyond the information embodied in the U.S. term structure. Portion of Canadian business cycle which cannot be explained by the U.S. term structure is captured by domestic term spread. Stock and Watson (1989) highlights the significant contribution of the ten-year and one-year U.S. Treasury bond spread in their newly contructed index of leading indicators. The dynamic of the reaction of output measures

[2] *The multiplication term ($R_{1t}\rho$) is relatively small and can safely be considered to be equal to zero.*

(GNP, investments, and consumption) toward increase in term spread is produced by Strongin (1990). It is shown that output react positively toward increased in term spread and up to forty two percent of variance in output forecast is due to shocks in spread. Same favourable results are provided by Estrella and Hardouvellis (1991). The four-quarter ahead level of term spread, which is defined as the difference between the annualized bond equivalent yield of the ten-year bond and and three-month T-bill rates, is shown to be an accurate indicator of NBER-dated recessions period.[3] Several recent studies argue on the weakening power of term spread in recent years. Haubrich and Dombrosky (1996) show that term spread are not able to accurately predict GDP growth when data set is limited to post-1985. Dotsey (1998) also notes that inclusion of other variables such as lagged output and level of short term rates reduces the predictive power of the spread between the discount equivalent yield on the ten-year U.S. Treasury bond and the three-month Treasury bill. The root mean square errors (RMSE) of out of sample forecast with or without term spread are not significantly different suggesting non-uniqueness of information content of term spread. [4]

An important issue highlighted by several previous studies is on the uniqueness of information conveyed by the term spread. Findings that term spread can predict economic performance accurately is irrelevance if the predictive power disappear when other indicators are accounted together. Strogin (1990), Estrella and Hardouvellis (1991), and Estrella and Mishkin (1997) among others stress the uniqueness of information embodied in the term spread. Inclusion of monetary indicators (growth of monetary aggregate or short term rates) do not affect the predictive power of term spread. Dotsey's (1998) out of sample forecast based on expanded equation that includes interest rates on three-month Treasury bills results in a lower explanatory power for term spread. Monetary indicators are often tested against term spread measures because of the possibility of changing in monetary conditions to affect interest rates. Christiano and Eichenbaum (1992), Leeper and Gordon (1992) and Kim and Ghazali (1998, 1999) provide supporting evidence showing the negative effect of monetary injection on the level of short term interest rates. Thus, there is a possibility that changing monetary conditions might affect the term spread while being

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[3] *The probability of recession is calculated based on a time series probit model. Similar analysis is performed by Estrella and Mishkin (1998) and Dueker (1997) using various other measures of term spread and economic activity. Both conclude on the superiority of term spread. The yield curve slope remains the single best recession predictor compared to other measures of leading indicators.*

[4] *Skeptical views on the ability of term spread to predict future inflation is also argued in several studies (see Fama (1990), Mishkin (1990), and Koedijk and Kool (1995)). Fama (1990) and Mishkin (1990) reject the ability of term spread to predict inflation in the short run but support its significance for the long run forecast. As shown later, this is inline with our findings that term spread has no information of short run variations in stock prices but assume significant role in the long run movement.*

transmitted into the economy. Taking into account the monetary conditions with the term spread simultaneously test the uniqueness of information carried by the term spread.

In this paper we add to the evidence on the predictive power of the term spread in several ways. Most of the existing studies generally use final output measures as dependent variable to gauge the predictive power of term spread. Our target variable is movement in stock prices. In principle, current stock prices incorporate information of future economic conditions. We move one step backward. We investigate whether term spread leads movement in stock prices. The leading role of term spread in predicting future activity is further strengthen if it is useful in predicting movement of stock prices.[5] In addition, our evidence is based on data set of a developing country that experience rapid financial progress. The Malaysian government securities market provides a good case study for emerging financial market. Measures taken by the Malaysian government to promote trading activities in the government securities market since 1989 allows quoted yields to be market determined, embodying information of current and future economic condition dictated by market forces.[6] The availability of market determined data since 1989 make this study possible. Evidence of leading behaviour of term spread consistent with findings that used data from developed markets signify the efficiency of government securities market in Malaysia, thus, endorsing efforts to promote market activity.

3. DATA SET AND EMPIRICAL ANALYSIS

Our analysis of the link between term spread and stock market movement covers a period of 10 years (1989:1-1998:12). The first data set involves monthly observations of Malaysian government securities yields for four different maturity period, i.e., 10-year (MGS10), 5-year (MGS5), 1-year (MGS1) and 3-month Treasury bills (TB3). Yields for government securities are gathered from Government Securities tables reported in the Investors Digest published by the Kuala Lumpur Stock Exchange (KLSE). Data for T bills rates are gathered from the Monthly Statistical Bulletin issued by Bank Negara

[5] *In an earlier study, Ghazali and Low (1999) support the predictive power of Malaysian term spread in predicting real output (proxied by the growth of Industrial Production Index). The evidence that spread can predict movement in stock prices further strengthen the role of term spread as leading indicator of economic performance for the Malaysian economy.*

[6] *Liberalization and promotion of Malaysian government securities (MGS) market begins in the late eighties. MGS with market based coupon rate were first issued in 1987. In January 1989 twenty-three principal dealers have been appointed to provide two way asked-bid quotations and underwrite primary issues of MGS. In addition, the issuance of MGS with maturities up to ten years is made via auction through principal dealers. In July 1999, new payment system called RENTAS (Real Time Electronic Transfer of Funds and Securities) replaces the existing system (Scriptless Securities Trading System-SSTS introduced in 1990) for the transfer and settlement of inter bank transactions and trading of government securities on real time basis. These measures transform the markets for government securities from a captive administered market to a market determined oriented.*

Malaysia (Central Bank of Malaysia). We tested three different measurements of term spread, i.e., MGS10 minus TB3, MGS5 minus TB3, and MGS1 minus TB3. We use four major indices of stock performance quoted by the Kuala Lumpur Stock Exchange, i.e. the Composite Index (COMP), Industrial Index (IND), Finance Index (FIN), and Property Index (PROP). The data for stock indices are down loaded from the MetaStock™. Finally in testing the uniqueness of information embodied the term spread we include the monetary indicators (M1 money-M1). This macro variable is reported in the Monthly Statistical Bulletin of Bank Negara Malaysia. All data series are specified in natural log except the term spread measures.

The predictive power of the term spread to signal movement of stock prices is analyzed by regressing the stock returns against term spread:

$$\Delta INDEX_t = a_0 + a_1 SPREAD_{t-i} + v_t \qquad (i = 1,2,3,\ldots 12) \qquad (8)$$

For each of the three term spread we estimate the response of seven different measures of stock returns, i.e. the contemporaneous movement of stock returns ($\Delta INDEX_t$) and six moving averages series of stock returns (moving average of 3, 6, 9, 12, 18, 24 months).[7, 8] We perform these regressions in order to isolate the predictive power of term spread for the short and long run movement of stock prices.[9] Short run movement in stock prices could be subjected to noise that can introduce erratic fluctuations. However, in the long run these noises are removed while fundamental factors remains. By testing different measures of dependent variables that reflect short and long run movements we are able to provide a more indepth view of the predictive power of term spread. We regress each of the dependent variable againsts lagged term spread measures up to twelve month lags. This gives us the description of the leading behavior of the spread. Our focus of analysis centers on the significance of the response coefficients (a_1). The null

[7] *In total we run 252 estimates of equation (8) and the same applies to equation (9). We run these volumes of regressions in assuring the comprehensiveness of our results. This is also motivated by previous researchers that employ different measure of term spread. Jorion and Mishkin (1991), for example, investigate the information content of term structure by estimating several regression equations. In the first regression equation, the term structure is defined as the spread between the annualized m-year interest rate and the one-year interest rate. In the second equation, term structure is analyzed in terms of future changes in the one-year spot rate. Mishkin (1988) uses one-to twelve-month U.S. Treasury bills where the slope of the term structure is defined as the difference between these Treasury bills.*

[8] *Ghazali (1993) and Ghazali and Low (2000) shows that yields Malaysian government securities are cointegrated and subject to a long run equilibrium force in line with the Pure Expectation hypothesis of the term structure. Since all the three term spread measures move relatively in tandem to each other the results derived could be qualitatively the same.*

[9] *The Newey and West (1987) method is used to estimate a consistent covariance matrices for our regression estimations. This takes care of both serial correlation and heteroskedasticity problems that are prevalence with overlapping observations in which period of observed data is greater than the observation interval.*

hypothesis is that a_1 is not significantly different from zero. Rejection of the null at 95 percent level supports the predictive power of term spread in signaling changes in stock returns. Based on the described model we expect the response coefficient to be positive indicating positive term spread to be associated with positive stock returns and vice versa.

Our second regression analysis explores the uniqueness of information conveyed by the term spread. Similar to Estrella and Hardouvellis (1991) we expand equation (8) to include another other macro variable, i.e growth of monetary aggregate as follows:

$$\Delta INDEX_t = a_0 + a_1 SPREAD_{t-i} + a_2 \Delta MON_{t-i} + v_t, \quad (i = 1,2,3,...12) \qquad (9)$$

Regression estimates for alternative measures of movement in stock prices (contemporaneous and moving averages series) as described earlier are performed in order to isolate the uniqueness of term spread information for the short and long run movement in stock prices. Adding the measures of monetary growth (ΔMON_t) as independent variable removes information which is not unique to the spread.[10] As discussed earlier skepticism on the predictive power of term spread could possibly arise from term spread's response to growth of monetary. If this channel of influence is strong and significant, then, the significance of term spread in predicting stock returns in isolation should disappear after the effect of monetary and agregate demand is taken into account. Evidence supporting uniqueness of term spread information requires the coefficients of response for the spread (a_1) to remain significantly different from zero at 95 percent significant level even after the impact of monetary growth is taken into account.

4. FINDINGS AND DISCUSSIONS

Prior to our regression analysis we first measure the linear association between stock returns and lagged term spread. We estimate the Pearson correlation coefficients between short (contemporaneous) and long run (moving average series) stock return with the term spread. The correlation coefficients reported in Table 1 indicate that lagged term spread is positively associated with the long run trend (24-month moving average series) of all indices but not with the short run stock returns.

[10] *Homa and Jaffee (1971), Hamburger and Kochin (1972), Rozeff (1974, 1975) provide earlier evidence on the effect of money on stock prices. Recent evidence can be found in Sorensen (1982), Dhakal, Kandil and Sharma (1993) and Thorbecke and Coppock (1996) Patelis (1997). Ghazali and Yaakob (forthcoming) provide evidence that the growth of monetary aggregate in Malaysia significantly affect the movement of stock prices but only in a transitory manner. Ghazali and Wong (2001) shows that only unanticipated changes in money growth is influencing the stock prices.*

These positive linear associations are significant up to seven-month lag. The significant coefficients averaging approximately 0.3426, 0.3495, 0.3160 and 0.3626 for the Composite, Industrial, Finance and Property index respectively. The significant linear association is further strengthened by the regression results reported in Tables 2a and 2b. Our estimations of Equation (8) support the predictive power of term spread in predicting the long run pattern of stock returns. None of the estimated coefficients (a_1) are significant when the contemporaneous and short run (3- month moving average series) are used as the dependent variable. However, when the long run stock movement (24-month moving average series) is used as dependent variable the results reversed. The estimated coefficients are now significantly different from zero at the 95 percent level up to about six months lag. Thus, previous term spread measure carries vital information concerning the long run trend in stock returns. The average coefficient of determinations (R^2) for these significant estimations are approximately 0.1395, 0.1445, 0.1177 and 0.1549 for the Composite, Industrial, Finance and Property index respectively. These relatively low R^2 s do not reject the importance of term spread since the estimated coefficients are significant but suggest that there are other variables omitted in the equations.

The information content of the term spread as identified above could lead to a misleading interpretation of term spread superiority. As discussed in the preceding section, term spread superiority can only be supported if information that it carries is unique. Tables 3a and 3b highlight the uniqueness of term spread information when monetary growth is added to the regression equation (Eq. 9). These tables show that even after adding the monetary variable, the significance of spreads coefficients for the six months identified earlier for the 24 months moving average series of stock returns remain intact. Thus, inclusion of money variable does not affect the importance of term spread. This is strengthened by the insignificant changes in the R^2s which remain relatively the same as those reported in Table 2a and 2b.

CONCLUSIONS

In recent years, various researches have shown that term spread, i.e. the difference between long term and short term yield of financial assets possesses valuable information about the path of future key economic variables. The ability to forecast future economic condition accurately is critical in stocks valuation. In this paper, we analyzed the predictive power of Malaysian Government Securities term spread in predicting the long run movement of share prices in Malaysia. We first estimated the Pearson correlation coefficients between short and long run stock return with the term spread. Our results support the positive association between term spread and stock indices. This result is strengthened when regression was performed on these variables. Term spread is shown to convey valuable information up to six months ahead. We also show that the information derived from the term spread is unique and not affected by monetary growth. These findings, therefore, indicate the usefulness of term spread in predicting stock movement. Thus, the incorporation of term spread in stock movement forecasting models are supported.

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Table 1. Correlation Between Growth of Stock Indices and Lagged Spread

	COMPOSITE INDEX			INDUSTRIAL INDEX			FINANCE INDEX			PROPERTY INDEX		
LAG	COMPG	MV3C	MV24C	INDG	MV3I	MV24I	FING	MV3F	MV24F	PROPG	MV3P	MV24P
1	0.2753*	0.3251*	0.3203*	0.1960*	0.2294*	0.2866*	0.2350*	0.2632*	0.3316*	0.1829*	0.2028*	0.3894*
2	0.2043*	0.3160*	0.3824*	0.1731	0.2450*	0.3596*	0.1167	0.2420*	0.3706*	0.0463	0.1635	0.4142*
3	0.0099	0.2065*	0.3968*	0.0683	0.2186*	0.3931*	-0.0655	0.1316	0.3647*	-0.0576	0.0717	0.4046*
4	-0.1362	0.0163	0.3951*	-0.0923	0.0686	0.4086*	-0.1718	-0.0759	0.3491*	-0.1503	-0.1019	0.3920*
5	-0.2375	-0.1922	0.3813*	-0.1563	-0.1097	0.4122*	-0.1839	-0.2346	0.3348*	-0.1655	-0.2177	0.3767*
6	-0.2092	-0.2513	0.3113*	-0.1509	-0.1892	0.3451*	-0.1278	-0.2330	0.2750*	-0.1385	-0.2254	0.3174*
7	-0.0898	-0.1619	0.2112*	-0.0637	-0.1097	0.2411*	-0.0571	-0.1180	0.1862*	-0.0652	-0.1212	0.2436*
8	0.0084	-0.0336	0.1331	-0.0168	-0.0042	0.1551	0.0313	0.0063	0.1134	0.0183	-0.0092	0.1730
9	0.0687	0.0617	0.1008	0.0843	-0.0885	0.1286	0.0701	0.0787	0.0787	0.0407	0.0549	0.1351
10	0.0670	0.0605	0.1283	0.0766	-0.0909	0.1666	0.0164	0.0551	0.0918	-0.0250	0.0134	0.1291
11	0.0795	0.0474	0.1606	0.0988	0.0844	0.2022*	0.0565	0.0293	0.1134	0.0082	-0.0321	0.1245
12	0.0771	0.0499	0.2039*	0.0611	0.0765	0.2516*	0.0326	0.0121	0.1413	0.0068	-0.0500	0.1352

Notes: 1. The reported correlation coefficients are correlation between growth of stock indices at time t and lagged spread.

2. Single asterisk (*) indicates coefficients are significantly different from zero at 95 percent level of significance.
3. COMPG, INDG, FING and PROPG denote the contemporaneous movement of stock returns for Composite, Industrial, Finance and Property Indices.
4. MV3C, MV3I, MV3F and MV3P denote the three months moving average series of stock returns for Composite, Industrial, Finance and Property Indices.
5. MV24C, MV24I, MV24F and MV24P denote the twenty-four months moving average series of stock returns for Composite, Industrial, Finance and Property Indices.

Table 2a. Regression Results Between Stock Indices (Composite Index and Industrial Index) and Lagged Spread

$$\Delta INDEX_t = a_0 + a_1 SPREAD_{t-i} + v_t$$

	COMPOSITE INDEX						INDUSTRIAL INDEX					
	COMPG		MV3C		MV24C		INDG		MV3I		MV24I	
LAG	a_1	R^2	a_1	R^2	a_1	R^2	a_1	R^2	a_1	R^2	a_1	R^2
1	3.21151	0.0835	2.7290	0.1145	0.9033	0.1131	2.5235	0.0459	1.8865	0.0626	0.7897	0.0972
	(1.90187)		(2.1134)*		(2.3990)*		(1.9622)		(1.7874)		(2.1665)*	
2	2.3147	0.0429	2.6377	0.1060	1.0722	0.1568	2.2421	0.0361	1.9649	0.0671	0.9756	0.1461
	(1.3742)		(1.7264)		(3.0184)*		(1.4285)		(1.5132)		(2.8513)*	
3	0.3446	0.0009	1.7623	0.0472	1.1090	0.1666	1.1066	0.0087	1.7865	0.0555	1.0436	0.1666
	(0.2790)		(1.3724)		(3.0483)*		(1.0142)		(1.6408)		(3.0061)*	
4	-1.2917	0.0132	0.2277	0.0008	1.0904	0.1589	-0.8523	0.0051	0.6401	0.0071	1.0577	0.1689
	(-1.1449)		(0.2296)		(2.8419)*		(-0.8322)		(0.6931)		(2.9486)*	
5	-2.5689	0.0515	-1.4633	0.0319	1.0472	0.1442	-1.7173	0.0205	-0.7309	0.0092	1.0650	0.1685
	(-1.4778)		(-1.2704)		(2.4700)*		(-1.0623)		(-0.7416)		(2.7153)*	
6	-2.2836	0.0402	-1.9840	0.0581	0.8665	0.0974	-1.7129	0.0201	-1.3722	0.0318	0.9046	0.1199
	(-1.3668)		(-1.4090)		(2.0762)*		(-0.9997)		(-1.0539)		(2.3473)*	
7	-1.0898	0.0075	-1.4270	0.0247	0.6687	0.0475	-0.7615	0.0033	-0.8650	0.0104	0.7179	0.0619
	(-0.7056)		(-0.9152)		(1.3919)		(-0.4986)		(-0.5676)		(1.6424)	
8	0.2741	0.0004	-0.2659	0.0008	0.4563	0.0196	0.4909	0.0012	0.0498	0	0.4867	0.0250
	(0.1873)		(-0.2282)		(0.8521)		(0.3862)		(0.0430)		(0.9880)	
9	0.9728	0.0052	0.6184	0.0040	0.3156	0.0091	1.1626	0.0066	0.8055	0.0078	0.3848	0.0154
	(0.4413)		(0.4207)		(0.5604)		(0.6026)		(0.6425)		(0.7364)	
10	0.7648	0.0032	0.5706	0.0034	0.4126	0.0154	0.9768	0.0046	0.8030	0.0076	0.5026	0.0260
	(0.3981)		(0.3336)		(0.8063)		(0.5679)		(0.5511)		(1.0858)	
11	1.2213	0.0077	0.5149	0.0026	0.5682	0.0285	1.5931	0.0118	0.8460	0.0082	0.6612	0.0443
	(0.7507)		(0.3207)		(1.1686)		(1.0446)		(0.5988)		(1.5598)	
12	1.0779	0.0059	0.5072	0.0025	0.6905	0.0416	0.9003	0.0037	0.7235	0.0059	0.7929	0.0633
	(0.6566)		(0.3512)		(1.3093)		(0.5685)		(0.5574)		(1.7384)	

Note : 1. Single asterisk (*) indicates significance at 95 percent level

2. Numbers in parantheses are Newey-West t-statistics that take into account the serial correlation and heteroskedasticity problems that are prevalence with overlapping observations in which period of observed data is greater than the observation interval.

Table 2b. Regression Results Between Stock Indices (Finance Index and Property Index) and Lagged Spread

$$\Delta INDEX_t = a_0 + a_1 SPREAD_{t-i} + v_t$$

	FINANCIAL INDEX						PROPERTY INDEX					
	FING		MV3F		MV24C		PROPG		MV3P		MV24P	
LAG	a_1	R^2	a_1	R^2	a_1	R^2	a_1	R^2	a_1	R^2	a_1	R^2
1	4.1857 (1.7682)	0.0560	3.0175 (1.6591)	0.0680	1.2703 (2.1971)*	0.1026	3.2202 (1.4094)	0.0307	2.3959 (1.3875)	0.0401	1.7140 (3.1270)*	0.1644
2	2.1944 (1.1164)	0.0152	2.7909 (1.3524)	0.0574	1.4500 (2.6548)*	0.1317	1.1006 (0.5194)	0.0035	1.9986 (1.0063)	0.0276	1.8287 (3.5330)*	0.1843
3	-0.9411 (-0.6042)	0.0028	1.5836 (1.0854)	0.0184	1.4376 (2.6076)*	0.1285	-0.7218 (-0.4810)	0.0015	0.9447 (0.6497)	0.0063	1.7845 (3.3626)*	0.1747
4	-2.8307 (-1.5057)	0.0248	-0.8074 (-0.6531)	0.0047	1.3834 (2.3976)*	0.1175	-2.7419 (-1.5782)	0.0220	-1.0869 (-0.8934)	0.0083	1.7084 (3.0576)*	0.1584
5	-3.3223 (-1.3923)	0.0337	-2.7317 (-1.5411)	0.0533	1.3386 (2.1052)*	0.1083	-2.9954 (-1.2831)	0.0259	-2.5337 (-1.4967)	0.0449	1.6426 (2.6491)*	0.1442
6	-2.2723 (-1.0547)	0.0156	-2.7459 (-1.3690)	0.0532	1.1164 (1.7239)	0.0744	-2.4999 (-1.1128)	0.0178	-2.6946 (-1.3751)	0.0503	1.4000 (2.1562)*	0.1034
7	-1.0493 (-0.5022)	0.0027	-1.5454 (-0.7413)	0.0138	0.8466 (1.1145)	0.0351	-1.3031 (-0.5656)	0.0040	-1.5608 (-0.7210)	0.0139	1.2043 (1.5223)	0.0627
8	0.8869 (0.3705)	0.0017	0.1649 (0.0890)	0.0001	0.5414 (0.6320)	0.0127	0.5533 (0.2403)	0.0006	-0.0642 (-0.0328)	0	0.8975 (1.0084)	0.0308
9	1.3733 (0.4717)	0.0040	1.0928 (0.4749)	0.0060	0.3762 (0.4172)	0.0060	0.8217 (0.2836)	0.0014	0.7543 (0.3293)	0.0028	0.6896 (0.7571)	0.0178
10	0.2993 (0.1198)	0.0002	0.7431 (0.3140)	0.0027	0.4424 (0.5234)	0.0082	-0.6036 (-0.2365)	0.0007	0.1594 (0.0683)	0.0001	0.6596 (0.7706)	0.0160
11	1.3676 (0.5676)	0.0038	0.4526 (0.2066)	0.0010	0.5787 (0.7021)	0.0135	0.2859 (0.1163)	0.0002	-0.4392 (-0.2004)	0.0009	0.6911 (0.8174)	0.0171
12	0.7335 (0.2897)	0.0011	0.1783 (0.0812)	0.0002	0.7155 (0.8244)	0.0199	0.1573 (0.0606)	0	-0.7445 (-0.3433)	0.0025	0.7219 (0.8132)	0.0183

Note: 1. Single asterisk (*) indicates significance at 95 percent level

2. Numbers in parantheses are Newey-West t-statistics that take into account the serial correlation and heteroskedasticity problems that are prevalence with overlapping observations in which period of observed data is greater than the observation interval.

Table 3a. Regression Results Between Stock Indices (Composite Index and Industrial Index) and Lagged Spread and Monetary Aggregate

$$\Delta INDEX_t = a_0 + a_1 SPREAD_{t-i} + a_2 \Delta MON_{t-i} + v_t$$

	COMPOSITE INDEX			INDUSTRIAL INDEX		
LAG	a_1	a_2	R^2	a_1	a_2	R^2
1	0.8658 (2.3483)*	8.1043 (1.9097)	0.1472	0.7539 (2.1160)*	7.7200 (1.9742)	0.1319
2	1.0288 (3.0207)*	10.1811 (2.1823)*	0.2105	0.9380 (2.8456)*	8.8444 (2.0191)	0.1917
3	1.0647 (3.0426)*	9.4338 (1.7852)	0.2125	1.0050 (2.9993)*	8.2163 (1.7129)	0.2058
4	1.0438 (2.8334)*	10.4950 (1.8284)	0.2155	1.0169 (2.9438)*	9.1932 (1.7241)	0.2180
5	0.9951 (2.4274)*	10.8996 (1.8268)	0.2051	1.0208 (2.6804)*	9.2179 (1.6432)	0.2177
6	0.8240 (2.0150)*	10.2110 (1.6378)	0.1504	0.8675 (2.2866)*	8.9375 (1.4613)	0.1659
7	0.6143 (1.2991)	9.2291 (1.5446)	0.0907	0.6661 (1.5513)	8.7921 (1.4736)	0.1062
8	0.4265 (0.8252)	9.0732 (1.6963)	0.0609	0.4575 (0.9658)	8.2537 (1.5634)	0.0636
9	0.2964 (0.5514)	8.5725 (1.8279)	0.0458	0.3643 (0.7381)	9.1782 (2.0737)	0.0628
10	0.3876 (0.7744)	6.5409 (1.7446)	0.0362	0.4799 (1.0624)	5.9248 (1.6047)	0.0454
11	0.5422 (1.1139)	3.1022 (0.8811)	0.0328	0.6342 (1.4991)	3.2175 (0.9607)	0.0496
12	0.6706 (1.2622)	2.4519 (0.6532)	0.0443	0.7758 (1.6946)	2.1095 (0.6131)	0.0656

Note : 1. Single asterisk (*) indicates significance at 95 percent level.

2. Numbers in parantheses are Newey-West t-statistics that take into account the serial correlation and heteroskedasticity problems that are prevalence with overlapping observations in which period of observed data is greater than the observation interval.

Table 3b. Regression Results Between Stock Indices (Finance Index and Property Index) and Lagged Spread and Monetary Aggregate

$$\Delta INDEX_t = a_0 + a_1 SPREAD_{t-i} + a_2 \Delta MON_{t-i} + v_t$$

	FINANCE INDEX			PROPERTY INDEX		
LAG	a_1	a_2	R^2	a_1	a_2	R^2
1	1.2147 (2.1177)*	11.9983 (1.7658)	0.1369	1.6572 (3.0587)*	12.2454 (1.7406)	0.1958
2	1.3870 (2.5886)*	14.7867 (1.9944)*	0.1836	1.7642 (3.5073)*	15.1454 (1.9966)	0.2323
3	1.3713 (2.5295)	14.1014 (1.7572)	0.1755	1.7189 (3.3056)*	13.9719 (1.7288)	0.2154
4	1.3158 (2.3214)*	15.2475 (1.8145)	0.1723	1.6403 (3.0037)*	15.3624 (1.8251)	0.2076
5	1.2634 (2.0168)*	15.7097 (1.8531)	0.1665	1.5697 (2.5640)*	15.2423 (1.7831)	0.1926
6	1.0530 (1.6412)	15.2560 (1.7743)	0.1290	1.3394 (2.0790)*	14.5989 (1.7016)	0.1475
7	0.7651 (1.0158)	13.8350 (1.7046)	0.0799	1.1253 (1.4275)	13.4148 (1.6548)	0.0998
8	0.4956 (0.5927)	13.9444 (1.8809)	0.0579	0.8519 (0.9829)	13.8678 (1.8497)	0.0701
9	0.3424 (0.3945)	15.1051 (2.2776)	0.0586	0.6567 (0.7500)	14.7163 (2.1689)	0.0617
10	0.4011 (0.4812)	10.8280 (1.8424)	0.0345	0.6156 (0.7322)	11.5155 (1.9069)	0.0423
11	0.5246 (0.6289)	6.4662 (1.0565)	0.0219	0.6195 (0.7257)	8.5377 (1.3445)	0.0302
12	0.6750 (0.7623)	5.0078 (0.7685)	0.0250	0.6684 (0.7455)	6.6118 (0.9882)	0.0262

Note : 1. Single asterisk (*) indicates significance at 95 percent level.

2. Numbers in parantheses are Newey-West t-statistics that take into account the serial correlation and heteroskedasticity problems that are prevalence with overlapping observations in which period of observed data is greater than the observation interval.