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The price linkage between stock market and equity mutual funds of Thailand

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Abstract

This study investigates short-run and long-run linkages between the Stock Exchange of Thailand SET100 Index and equity mutual funds. The evidence is based on tests for pairwise Johansen cointegration and Granger-causality approaches. The evidence shows that the Thailand stock market is not cointegrated with equity mutual funds, indicating long-run benefits existed for investors from diversifying equity mutual funds managed by the eight major asset management companies and the stock market in Thailand over the period of 2 May 2005 to 31 December 2010. There is some evidence indicating the short-run causal links run both ways between the stock market and equity mutual funds.

Keywords: The price linkage, stock market, equity mutual funds, Thailand

1 Introduction

In recent decades, there has been rapid global growth in mutual funds. The statistics suggest that, in Thailand, equity managed funds contribute strongly to the Thai managed fund industry. According to the Association of Investment Management Companies (AIMC), by the end of the fourth quarter of 2011, the three largest total assets under management were fixed income mutual funds (60%), equity mutual funds (22%), and resolving financial institution funds (7%). Equity mutual funds play a vital role in Thailand in investment and saving, capturing 458 million Baht of the mutual fund assets under management in the fourth quarter of 2011, according to AIMC (2011).

Increased access to equity markets provides expanded opportunities for investors to diversify their investments. It is reasonable to expect that there is some degree of price responsiveness between the stock market and equity mutual funds. The degree and direction to which fund price companies are related to the stock market index are important not only for investors and fund managers with regard to their investment strategies, but also to academics and policy makers examining the implications of investing in domestic equity markets. The primary aim of this study is to examine the magnitude of price linkages between equity mutual funds and the stock market. The cointegration test is utilised to uncover the long-run equilibrium among the specified variables while the Granger-causality test reveals how equity mutual fund prices may affect stock index price and vice versa.

The remainder of this study is organised as follows. Section 2 provides a review of the theory and the literature in terms of fund price interaction. Section 3 discusses a specific model for investigating price interaction, also describes the data. Section 4 discusses the findings of the primary analysis. Section 5 provides a and policy implications. Finally, section 6 concludes the paper.

2 Literature review

The literature available on fund performance begins with Sharpe (1966) and Jensen (1968), who claim that mutual funds have under-performed against the benchmark. Grinblatt and Titman (1989a) find that the fund performance of a sample of US active mutual funds is no better before and after expenses than their passive benchmark, the S&P 500. However, there is some evidence in later studies that mutual funds out-perform the passive benchmark (Hendricks et al., 1993, Goetzmann and Ibbotson, 1994). In Thailand, given a limited number of studies of mutual funds with a focus mostly on mutual fund performance, Soongswang and Sanohdontree (2011a, 2011b) evaluate the performance of Thai mutual funds using returns for 138 equity mutual funds during the period 2000 to 2007. The study suggests that mutual funds are able to beat the local stock market index according to Treynor, Sharpe, and Jensen measures. Therefore, there is strong evidence of abnormal returns of the funds. Ferreira et al. (2013) analyse the open-end equity mutual fund performance of 148 Thailand mutual funds over the period 1999 to 2005. The evidence shows that the average alpha is positive by using the Carhart four-factor model to measure fund performance.

Another set of studies provides empirical evidence on the relationship between mutual funds and the macroeconomic variables and evaluates the issues using cointegration and causality tests. Allen and MacDonald (1995) used cointegration techniques to investigate international equity mutual funds using Australia as a main part of the study's sample of financial markets. The findings indicate that Australia does not have a long-term equilibrium relationship with the other 15 country funds in the sample. Recent empirical studies show that the price linkages in the equity market are not only international, but also regional. Matallin and Nieto (2002) examine the relationship between mutual funds and the stock market in Spain and conclude that there is no evidence of a long-term equilibrium relationship. Low and Ghazali (2007) examine short- and long-run price linkages using evidence from Malaysia. The findings reveal no evidence of long-run equilibrium between unit trust funds and the local stock market index price. In the short-run, the Granger-causality tests indicate that unit trust funds and the local stock market index have a one-way relationship with market-to-fund causality. However, the study tests only one-way causality on past values of mutual funds and the stock market index. Chu (2010) examines short- and long-run price linkages with evidence from Hong Kong using monthly fund prices for 101 mandatory provident funds. The study finds some funds have both a long- and a short-run relationship.

According to portfolio theory, the gains from a diversified portfolio involve different degrees of price co-movement between securities. The efficiency of the financial market and rational expectations theory give rise to forecasting tests that mirror those adopted when testing the optimality of a forecast in the context of given information set. If domestic equity markets have a long-run tendency to diverge, there exist apparent gains from domestic diversification. On the other hand, the convergence of security prices suggests that one security's price can be used to predict the other.

This study differs from previous studies in several ways. First, most recent studies investigate the relationship of mutual fund price volatility by controlling for individual mutual funds (e.g., Matallín-Sáez and Nieto, 2002; Low and Ghazali, 2007), while the current study examines price linkages by controlling for asset management companies. Second, other studies test unidirectional causality (e.g., Low and Ghazali, 2007). In contrast, the current study provides an analysis of bi-directional causality between the specified variables. It is believed, from a thorough search of the literature, that no other study has used Johansen cointegration and the Granger-causality tests to investigate the price linkage between equity mutual funds and market security prices using Thailand data. The study contributes further with its investigation of the potential benefits from domestic diversification by using equity mutual fund companies, which have not been addressed in the causal relationships of Thai equity mutual funds previously.

3 Data and methodology

The study uses daily closing prices in eight different companies of open-ended Thailand equity mutual funds: MFC Asset Management Co., Ltd., TISCO Asset Management Co., Ltd., SCB Asset Management Co., Ltd., BBL Asset Management Co., Ltd., One Asset Management Co., Ltd., Kasikorn Asset Management Co., Ltd., UOB Asset Management (Thai) Co., Ltd., and Thanachart Fund Management Co., Ltd. Together, these companies represent 53 equity mutual funds. The SET100 Index is used as a market portfolio for each equity mutual fund category because this index comprises the largest 100 equity shares by average market. Historical daily data on equity mutual fund prices and the SET100 Index are obtained from the Morningstar Direct Database over the period 2005 to 2010.

All variables are transformed into natural logarithms because, over time, prices are skewed, so a lognormal distribution better reflects the reality of the prices (Harrington, 1987). The seminal paper by Granger and Newbold (1974) shows that the problem of spurious regressions exists in those regressions containing non-stationary variables. Therefore, the vector autoregression (De Gooijer and Sivarajasingham) model is designed for use with non-stationary series that are known to be cointegrated (Ben-Zion et al., 1996, Chu, 2011). As a result, it is necessary to test the variables for stationarity before proceeding with the analysis of the VAR model. The dynamic relationships are tested using VAR. Long-run price co-movements are detected by employing Johansen cointegration tests and the short-run price dynamic is analysed by using Granger-causality approach.

4 Primary findings

The study performs the ADF (Dickey and Fuller 1979, 1981) and the PP (Phillips and Perron 1988) tests to test for the presence of unit roots in both price levels and the first difference of the variables. The ADF tests performed well when serial correlation is present in level series relationships, while the PP tests are a better test in the case of structural breaks (Glynn et al., 2007). The null hypothesis is that all series variables are non-stationary against the alternative hypothesis that all series variables are stationary. The results of unit root tests are present in Table 1.

Table 1 Unit root tests

Variables	Augmented Dickey-Fuller test		Phillips Perron test	
	Level	1 st Difference	Level	1 st Difference
SET	-0.615136	-25.53650*	-0.660596	-39.47973*
MFC	-0.491742	-40.03883*	-0.517999	-40.00518*
TISCO	-1.844052	-39.38879*	-1.826561	-39.39079*
SCB	-0.563001	-37.82449*	-0.682683	-37.86757*
BBL	-1.227669	-40.58047*	-1.166280	-40.55156*
ONE	-0.961979	-40.46341*	-0.893920	-40.44810*
KASI	-1.330308	-39.66543*	-1.302322	-39.65967*
UOB	-1.462721	-40.55190*	-1.396734	-40.53949*
THAN	-1.151698	-40.09853*	-1.138746	-40.07662*

Note: the critical values for the ADF and the PP test statistic with intercept at the 0.01 level are -3.4345, -2.8632 and -2.5677, respectively. * indicates significance at the 1% level. SET represents the Thailand stock market index (SET100 Index). Thailand equity mutual funds are divided into eight equity mutual fund companies (MFC Asset Management Co., Ltd. (MFC), TISCO Asset Management Co., Ltd. (TISCO), SCB Asset Management Co., Ltd. (SCB), BBL Asset Management Co., Ltd. (BBL), One Asset Management Co., Ltd. (ONE), Kasikorn Asset Management Co., Ltd. (Kasibhatla et al.), UOB Asset Management (Thai) Co., Ltd. (UOB), Thanachart Fund Management Co., Ltd (THAN)).

The results indicate that the logarithmic closing prices are non-stationary as the t -statistic critical values are greater than the ADF and the PP critical values. The study then applies the same test to their first differences. The results show a rejection of the null hypothesis and an acceptance of the alternative hypothesis in that all level series variables are stationary at the 1% level of significance. It can be seen that the t -statistics critical value has smaller values than the ADF and the PP critical values. Thus, each price series is found to be stationary at the first differences ($I(1)$).

Since the time series of equity mutual fund prices and the stock market index price are $I(1)$, there exists the possibility of a long-run equilibrium relationship between them. The study employs a specific VAR estimated to apply a specific lagged endogenous multivariate model. Three different information criteria are used for model selection in order to determine the appropriate lag length of the VAR models along with the Likelihood Ratio (Angermann et al.), Wald test for lag exclusion and the Final Prediction Error (FPE). The information criteria are Akaike information criterion (AIC), Schwarz Information criterion (SC) and Hannan-Quinn criterion (HQ). Results of lag order selection, in most cases, suggest that the lag length of VAR is $p = 3$ according to FPE and AIC. The SC finds one lag as the appropriate lag length, while the VAR lag exclusion Wald and HQ tests indicate that two lags are significant for the system. By selecting lag length criteria, the statistical results show that lags of order three are sufficient based on that suggested by the VAR lag exclusion Wald test and HQ statistics. Hence, the study selects the optimal lag with the lag interval one to three for cointegration and causality tests based on the VAR. This decision is justified based on the interaction of these variables in a level of relatively efficient Thai stock market (Khanthavit et al., 2012).

The next stage in the analysis consists of determining whether the equity mutual fund companies are cointegrated with the SET100 Index. Testing for the presence of cointegration among the variables involves the use of the maximum likelihood method, according to Johansen (1988) based on a VAR. The null hypothesis (H_{01}) is that there is no long-term equilibrium relationship

between the equity managed fund prices and the stock market index price. Both Trace and Maximum eigenvalue statistics are based on the assumption of linear trends in the data, but on no trends in the cointegration equations since the variables have an upward trend (Allen and MacDonald, 1995).

The values of the Trace and Maximum eigenvalue statistics and the critical values were calculated using the Johansen cointegration technique and reported in Table 2. Clearly, the null hypothesis (H_{01}) of there being no long-term equilibrium relationship between the equity managed fund prices and the stock market index price cannot be rejected in any of the cases tested. The absence of cointegration between equity mutual fund prices and the local market index price of the study supports the previous studies in this field. For example, the Ben-Zion et al. (1996) study of the price linkages between country funds and national stock markets (Germany, Japan, and UK) where they find no evidence of cointegration between country fund prices and the local market index. Matallin and Nieto (2002) find a number of Spanish mutual funds were cointegrated with the Spanish stock market index (The Ibex 35), where 48 out of 63 funds studied were not cointegrated with the local stock market. Low and Ghazali (2007) examine long-run price linkages using evidence from Malaysia. The findings reveal no evidence of long-run equilibrium between unit trust funds and the local stock market index price. Chu (2010) finds evidence of cointegration between the equity mutual funds and the local stock market index using the Hong Kong stock market. A figure of 54.39% of the sample of equity mutual funds does not have long-run price relationships with the local stock market index. Chu (2011) finds that 55.56% of the equity mutual funds are not cointegrated with the Hong Kong stock market index.

Table 2 Johansen cointegration

BBL Asset Management Co., Ltd.				One Asset Management Co., Ltd.			
Null	Alternative	Trace	95%	Null	Alternative	Trace	95%
$r = 0$	$r \geq 1$	3.471658	15.49471	$r = 0$	$r \geq 1$	11.92563	15.49471
$r \leq 1$	$r \geq 2$	0.059053	3.841466	$r \leq 1$	$r \geq 2$	0.403727	3.841466
Null	Alternative	Max	95%	Null	Alternative	Max	95%
$r = 0$	$r = 1$	3.412605	14.26460	$r = 0$	$r = 1$	11.52190	14.26460
$r \leq 1$	$r = 2$	0.059053	3.841466	$r \leq 1$	$r = 2$	0.403727	3.841466
MFC Asset Management Co., Ltd.				Kasikorn Asset Management Co., Ltd.			
Null	Alternative	Trace	95%	Null	Alternative	Trace	95%
$r = 0$	$r \geq 1$	8.096714	15.49471	$r = 0$	$r \geq 1$	3.772476	15.49471
$r \leq 1$	$r \geq 2$	0.248699	3.841466	$r \leq 1$	$r \geq 2$	0.165424	3.841466
Null	Alternative	Max	95%	Null	Alternative	Max	95%
$r = 0$	$r = 1$	7.848015	14.26460	$r = 0$	$r = 1$	3.607052	14.26460
$r \leq 1$	$r = 2$	0.248699	3.841466	$r \leq 1$	$r = 2$	0.165424	3.841466
TISCO Asset Management Co., Ltd.				UOB Asset Management (Thai) Co., Ltd.			
Null	Alternative	Trace	95%	Null	Alternative	Trace	95%
$r = 0$	$r \geq 1$	5.232095	15.49471	$r = 0$	$r \geq 1$	8.769999	15.49471
$r \leq 1$	$r \geq 2$	0.324703	3.841466	$r \leq 1$	$r \geq 2$	0.001975	3.841466
Null	Alternative	Max	95%	Null	Alternative	Max	95%
$r = 0$	$r = 1$	4.907392	14.26460	$r = 0$	$r = 1$	8.768023	14.26460
$r \leq 1$	$r = 2$	0.324703	3.841466	$r \leq 1$	$r = 2$	0.001975	3.841466
SCB Asset Management Co., Ltd.				Thanachart Fund Management Co., Ltd			
Null	Alternative	Trace	95%	Null	Alternative	Trace	95%
$r = 0$	$r \geq 1$	4.141163	15.49471	$r = 0$	$r \geq 1$	12.61775	15.49471
$r \leq 1$	$r \geq 2$	0.858142	3.841466	$r \leq 1$	$r \geq 2$	0.188315	3.841466
Null	Alternative	Max	95%	Null	Alternative	Max	95%
$r = 0$	$r = 1$	3.283021	14.26460	$r = 0$	$r = 1$	12.42943	14.26460
$r \leq 1$	$r = 2$	0.858142	3.841466	$r \leq 1$	$r = 2$	0.188315	3.841466

Note: The critical values used for the test are defined by Mackinnon (1999).

The next stage in the analysis consists of the short-run relationship between the Thai stock market index and equity mutual funds. The study also tests for short-run relationships between each equity mutual fund company within the specified model. In order to investigate this, the study uses pairwise Granger-causality tests with an *F*-statistic to indicate the existence of a short-term relationship between the variables. Under the null hypothesis (H_{02}), there is no short-term Granger-causal relationship between equity managed fund prices and the stock market index price. The hypothesis (H_{03}) concerns the short-run relationship between equity mutual fund companies indicating that there is no short-term relationship between the equity managed fund price companies.

Table 3 Granger-causality

ID D	SET	BBL	KASI	MFC	ONE	SCB	THAN	TISCO	UOB
SET		2.6573* *	1.7145	2.4661	3.7215* *	4.6907*	4.4005*	0.7392	4.7740 *
BBL	2.9526 **		2.4562	0.7460	0.3883	8.9055*	0.1089	0.3044	0.8929
KASI	2.6220 **	2.2690		1.4746	2.3164	1.4311	2.9941* *	0.9705	3.4237 *
MFC	2.7436 **	1.7561	1.9628		2.9220* *	5.4223*	1.8626	1.2465	5.1036 *
ONE	6.3892 *	0.4620	1.7860	2.3761		7.1466*	0.4771	1.4351	1.8348
SCB	1.7872	2.6941* *	0.7083	2.5054	2.6868* *		3.8139*	1.8054	5.5178 *
THAN	9.3518 *	1.2469	4.8489 *	3.1741* *	2.9325* *	12.911*		2.4733	2.1337
TISCO	0.4569	0.2578	0.2892	0.4352	0.1825	1.7812	0.0677		0.5330
UOB	4.5142 *	0.8169	1.7837	2.0950	1.2617	7.2335*	1.6507	0.5476	

Note: * and ** represent a rejection of the hypotheses of non-causality at the 1% and 5% significance levels, respectively. D and ID represent the dependent variable and independent variable, respectively. SET represents the Thailand stock market index (SET100 Index). Thailand equity mutual funds are divided into eight equity mutual fund companies (MFC Asset Management Co., Ltd. (MFC), TISCO Asset Management Co., Ltd. (TISCO), SCB Asset Management Co., Ltd. (SCB), BBL Asset Management Co., Ltd. (BBL), One Asset Management Co., Ltd. (ONE), Kasikorn Asset Management Co., Ltd. (Kasibhatla et al.), UOB Asset Management (Thai) Co., Ltd. (UOB), Thanachart Fund Management Co., Ltd (THAN)).

Table 3 reports the results of the short-run relationships between the specified variables. In most cases, the findings fail to reject the null hypothesis (H_{02}) of no short-run price relationship between equity managed funds and the stock market index. The Granger-causality results show that there are four pairs of bi-directional price causality between the equity mutual fund companies and the stock market. First, a causal link exists between SET100 Index and BBL, suggesting the BBL equity mutual fund prices are determined by the changes in the SET100 Index price at the 5% level of significance. Second, the results indicate the stock market index prices do contribute greatly to changes in the ONE equity mutual fund prices at the 1% level of significance. Third, the study finds that the SET100 Index prices have an influence on the THAN equity mutual fund prices at the 1% level of significance. Fourth, the SET100 Index prices are determined by the UOB equity mutual fund prices in the short-run at the 1% level of significance. Furthermore, Granger-causality between the stock market index and the KASI and MFC equity mutual fund prices is one-way (stock market to equity mutual funds) at the 5% level of significance. The SCB equity mutual fund prices trigger Granger cause changes to the SET100 Index at the 1% level of significance. There is no Granger-causality between the stock market index and the TISCO equity mutual fund prices.

With the inclusion of the tests for the short-run price relationship between equity mutual fund companies, the findings reject the null hypothesis (H_{03}) and accept the alternative hypothesis, for there is a short-term Granger-causal relationship between the equity managed fund price companies at the 1% and 5% levels of significance. There are five pairs of bi-directional price causality among the equity mutual fund companies. First, a causal link exists between the BBL funds and the SCB funds indicating the SCB fund prices contribute more to changes in the BBL fund prices at the 1% level of significance. The second pair is the THAN funds and the KASI funds suggesting the KASI fund prices contribute more to changes in the THAN fund prices at the 1% level of significance. The third pair is the SCB funds and the ONE funds. The finding suggests that changes in the SCB fund prices Granger cause the change in the ONE fund prices at the 1% level of significance. The fourth pair is THAN funds and the SCB funds, indicating the SCB fund prices contribute more to changes in the THAN fund prices at the 1% level of significance. The last pair is the UOB funds and SCB funds suggesting the SCB fund prices contribute more to changes in the UOB fund prices at the 1% level of significance.

The study finds a one-way Granger-causality between the MFC funds and the THAN funds at the 5% level of significance running from the MFC fund prices to the THAN fund prices. Results show that the ONE fund prices drive the MFC and THAN fund prices at the 5% level of significance. The results show Granger-causality runs from the SCB fund prices to the BBL and MFC fund prices at the 1% level of significance. The findings suggest that changes in the UOB fund prices cause the change in the KASI and MFC fund prices at the 1% significance level. Therefore, no directional price causal link exists between the TISCO fund price and other equity mutual fund companies.

The findings support some of the previous studies in this field. For example, Ben-Zion et al. (1996) find a two-way causal relationship between country funds and the local stock market. Low and Ghazali (2007) provide evidence of the Granger-causality test indicating that unit trust funds and the local stock market index have a one-way relationship with market-to-fund causality.

5 Implications

There are existing potential long-run domestic portfolio diversification gains for investors in the sense that there is no evidence of a cointegrating of the relationship between equity managed fund company prices and the SET100 Index prices according to portfolio theory. Investors are likely to achieve considerable benefits by diversifying between these two financial instruments in the long-run, as their prices have been shown to have been independent of each other. The result suggests that equity mutual fund companies would do well to design their portfolios to beat the stock market in the long run. In the short-run, investors can find the direction in equity mutual fund price companies (BBL, KASI, MFC, ONE and THAN) by observing movements in the stock market prices. However, investors may not gain insights into the activities of the SCB, TISCO and UOB equity mutual fund companies by observing the price movement in the SET100 Index. Based on the rational expectations and the efficient market hypothesis, the expectations of future prices are using knowledge of the past price behaviour in the SCB asset management company to improve forecasts of prices in other asset management companies and the stock market index.

6 Conclusion

The primary aim of this study was to examine the magnitude of price linkages between equity mutual funds and the stock market in an optimally lagged model. The study performed a unit root test on both the price levels and first difference of the variables. Based on the ADF and the PP results, the level series of price variables are non-stationary and the log return series of the variables are stationary data and do not contain a unit root. The Johansen cointegration tests were used to identify the long-run relationships, while Granger-causality tests examined the short-run causality between the variables. The results imply that equity mutual fund companies engage in active stock selection and market timing to construct their portfolios with the objective of beating the market in the long run. The results suggest that, in most cases, the equity mutual fund companies are related to the stock market index in the short run and this implies that the equity mutual fund companies are dominated by the SET100 Index with the exception of the TISCO Asset Management company. In the short-run, investors can find the direction in equity mutual fund price companies by observing the price movements in the stock market.

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