THE RELATIONSHIP BETWEEN PROPERTY FUND AND STOCK MARKET

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บทคัดย่อ

การศึกษานี้ทำการตรวจสอบความสัมพันธ์ระหว่างกองทุนรวมอสังหาริมทรัพย์และตลาดหุ้น ช่วงระหว่างปี พ.ศ. 2546 ถึงปี พ.ศ. 2556 โดยมีการจัดกลุ่มหุ้นสามัญเป็น 4 ประเภท ประกอบด้วย หุ้นสามัญ ประเภทมูลค่า หุ้นสามัญประเภทเติบโต หุ้นสามัญประเภทขนาดปานกลาง และหุ้นสามัญประเภทขนาดเล็ก และใช้กลุ่มทรัพย์สินประเภทอื่นๆ เป็นตัวแปรควบคุมการวิจัย เพื่อหาความสัมพันธ์ระหว่างหุ้นสามัญประเภท ต่างๆ ที่มีต่อกองทุนรวมอสังหาริมทรัพย์ ทั้งนี้ในการวิเคราะห์ข้อมูลพบว่า กองทุนรวมอสังหาริมทรัพย์ ให้อัตราผลตอบแทน ค่าเบี่ยงเบนมาตรฐาน และค่าสัมประสิทธิ์ของการแปรผันอยู่ในระดับปานกลางของ กลุ่มสินทรัพย์ อย่างไรก็ตามเมื่อตรวจสอบด้วยการใช้วิธีของชาร์ปพบว่า อัตราผลตอบแทนของกองทุนรวม อสังหาริมทรัพย์มีความคล้ายกับอัตราผลตอบแทนของหุ้นสามัญ 26% โดยมาจากหุ้นสามัญประเภทมูลค่า 0% หุ้นสามัญประเภทเติบโต 4% หุ้นสามัญประเภทขนาดปานกลาง 9% และหุ้นสามัญประเภทขนาดเล็ก 13%

คำสำคัญ : กองทุนรวมอสังหาริมทรัพย์ หุ้นสามัญประกอบด้วย หุ้นสามัญประเภทมูลค่า หุ้นสามัญประเภท เติบโต หุ้นสามัญประเภทขนาดปานกลาง หุ้นสามัญประเภทขนาดเล็ก

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ABSTRACT

This study examines the relationship between Thai property funds and stock market during 2003 to 2013. Common stocks are grouped into value stock, growth stock, medium capitalization stock, and small capitalization stock. Other asset classes are used as controlled variables to find the influence of the mentioned stock classes on property fund. The descriptive data show that property fund's return, standard deviation, and coefficient of variation are ranked in the middle of these assets' group. However, Sharpe's investigation methodology unveils that property fund's return is similar to the overall stock's return by 26%, including value stock 0%, growth stock 4%, medium capitalization stock 9%, and small capitalization stock 13%.

Keywords: Property funds, value stock, growth stock, medium capitalization stock, and small capitalization stock

INTRODUCTION

Property fund investment provides opportunity for those who would like to invest in real property but have less money or need liquidity in the investment. To meet these investors' demand, the fund invests investors' money in real property which pays a regular income and distributes most profit back to them. The exchange trading of property fund creates liquidity for investors who may need to withdraw money from the investment when they need money.

Many investors view property fund as common stock because the ownership of property fund unit-holders over the fund is similar to the ownership of common stock holders over the company. Both groups of investors receive benefit from the fund's residual income. Besides, property fund and common stock are trading in the same stock exchange. Moreover, the Stock Exchange of Thailand has grouped property fund in property and construction group under property fund and REIT sector and counts it in SET index calculation.

However, there are very few researches done on the relationship between property fund and common stock market. Most researchers devote their time to common stock analysis only. This research paper promotes the understanding on the property fund. Investors will know the risk level they have to face and the return they can expect from property fund investment in relation to common stock market. As a result, a better investment decision could be made and more efficient portfolio could be constructed for investors' benefit.

This research applies Sharpe asset class factor model in Sharpe (1992) to analyze the property fund's return during 2003 to 2013 and finds that the property fund's return is associated with common stock's return.

PRIOR LITERATURES

Property funds in Thailand are less flexible than Real Estate Investment Trusts (REITs) in three important areas; the real estate investment limitation which allows the funds to invest in only Thai real property, the maximum debt leverage at 10% of their assets and the maximum holding (per one investor) 33.33% of the total investment units of the Fund. However, the prior studies on REITs provide informative data which help in understanding

Thai property funds investment since the sources and uses of money of both property funds and REITs are very similar.

A lot of literatures support the relationship between REITs and common stocks. For example, Myer and Webb (1993) discovers that REITs return is more similar to common stock return than real estate return. Li and Wang (1995) reports that REITs and stock market are not separated into segments. Ghosh, Miles and Sirmans (1996) informs that in relation to stock, REITs have lower liquidity. Glascock, Lu, and So (2000) states that REITs are more similar to common stocks than bonds. Liang (2000) reports that REITs are close to income stocks. Cotter and Stevenson (2006) concludes that the relationship between REITs and common stocks become stronger. Case, Yang, and Yidirim (2012) uses dynamic conditional correlation model with generalized autoregressive conditional Heteroskedasticity to investigate the changes in the correlation between publicly traded REITs and non-REIT stocks and finds that from September 2001 to late 2008 the correlations increase steadily. Buranasiri and Nittayakasetwat (2013) discovers that property funds' IPOs provide positive return but very small, compared to common stock's IPOs.

However, there are also many researches who disagree on the relationship between REITs and stocks. They view REITs as either bonds or real properties. The bond view is from the reason that REITs' operating incomes are highly predictable and at least 90% of their income is distributed to its investors for tax-exemption. Consequently, the investors' return is also highly predictable and, therefore, REITs should be sensitive to interest rate, the same as other bonds. Many tests on the interest rate sensitivity of REITs are done and find the supportive evidence. He, Webb and Myer (2003) finds that Equity REIT's return is sensitive to the yields of long-term government and corporate bonds. Buranasiri and Nittaya Kasetwat (2012) shows the existence of the relationship between REIT return and long-term corporate bond return.

For the real properties view, because income of REITs are generated from the purchased real properties and most of their profit is returned to investors, a group of researchers have explored the evidence of the relation between the return of REIT investment and the return of real estate investment. For example, Liao and Mei (1998) concludes that the return of REITs and the capitalization rate of real property is connected. Chan, Erickson and Wang (2003) suggests that REITs could be considered asset securitization on real estate. Nevertheless, many studies such as Goetzman and Ibbotson (1990) indicate that REITs' and their real property's return are not significantly related.

For the research methodology, Sharpe (1992)'s technique is found to be the method which could help to explain the relationship between property fund and stock market clearly. Generally, a portfolio is built from different asset classes to imitate the performance of a fund and the weight of each asset class, hence, shows the contribution of each particular asset class on the fund. The various asset classes could be added as controlled variables for this paper and the characteristics of a property fund in relation to common stock market could be better examined.

OBJECTIVE OF STUDY

The objective of this study is primarily to examine the relationship between property fund and stock market. The results from this method provide benefit at least three aspects. First, they put in more evidences for academic researches on property fund investment. Second, the findings reveal the property fund's return in relation to many asset classes. Last, the results show the possibility for building a synthetic portfolio to replicate property fund's performance and, hence, arbitrage opportunity for investors.

DATA AND METHODOLOGY

To investigate the relationship between property fund and different asset classes, 12 mutually exclusive asset classes are selected for the model. The quarterly returns of stock asset classes and property funds are calculated from the equally weighted portfolio because the value based portfolio is difficult to construct by and impractical for ordinary investors. The following table describes the quarterly returns of equally weighted property fund portfolio and of 12 asset classes applied for this paper:

Table 1 Description of 12 asset classes

Asset Classes	Description
PF	Quarterly return of equally weighted property fund portfolio (Bloomberg).
S_GOV	Quarterly return of Thailand government's zero-coupon 3 month securities (Bloomberg).
M_GOV	Quarterly return of Thailand government's zero-coupon 5 year securities (Bloomberg).
L_GOV	Quarterly return of Thailand government's zero-coupon 20 year securities (Bloomberg).
COR_BOND	Quarterly return of Thailand's investment grade corporate bond (Bloomberg).
GLO_BOND	Quarterly return of global market bonds. This study uses JPM Global Aggregate Bond Index - Total Return Unhedged USD (Bloomberg) as proxy.
DEV_BOND	Quarterly return of developed market bonds. This study uses FINRA - BLP Active Investment Grade US Corporate Bond Total Return Index (Bloomberg) as proxy
EME_BOND	Quarterly return of emerging market bonds. This study uses JPMorgan Emerging Markets Bond Index EMBI Global Core (Bloomberg) as proxy.
V_STOCK	Quarterly return of the first 25 stocks with highest book to price ratio chosen from the 50 largest capitalization stocks trading in the Stock Exchange of Thailand with (Bloomberg). These stocks do not include property funds. The 50 largest capitalization stocks represent the big capitalization stocks in Thailand as SET 50 Index, the index built from 50 largest stocks, denote the large capitalization stocks. These large capitalization stocks are, then, ranked from the highest book to price ratio to lowest book to price ratio. The first half of the group are value stocks and the rest are growth stocks.

G_STOCK	Quarterly return of the first 25 stocks with lowest book to price ratio chosen from the 50 largest capitalization stocks trading in the Stock Exchange of Thailand with (Bloomberg). These stocks do not include property funds.
M_STOCK	Quarterly return of the 80% of the largest capitalization stocks from the remainders of stocks trading the Stock Exchange of Thailand after the 50 largest capitalization stocks have been selected. These stocks do not include property funds.
S_STOCK	Quarterly return of the last 20% of stocks with lowest capitalization chosen from the Stock Exchange of Thailand excluding the 50 largest capitalization. These stocks do not include property funds.
LAND	Quarterly return of land. This study uses land index from the Bank of Thailand.

This research collects time series data of property funds listed on the Stock Exchange of Thailand and 12 asset classes from the last quarter of 2003, when property fund was introduced in Thailand, to the last quarter of 2013 from Bloomberg database and the Bank of Thailand database.

The study applies the asset class factor model from Sharpe (1992) to examine the linkage between property funds and stock market. First, a portfolio built from 4 stock asset classes including value stock class, growth stock class, medium capitalization stock, and small capitalization stock, is created to replicate the equally-weighted property fund portfolio. The weight for each asset class explains the part of property fund which is similar to the class. The models are shown in the below equations:

$$R_i = (b_{i1}F_1 + b_{i2}F_2 - ..b_{in}F_n) + e_i \qquad \text{(1) or}$$
$$e_i = R_i - (B_{i1}F_1 + b_{i2}F_2 + ..b_{in}F_n) \qquad \text{(2)}$$

Where R_i is return on asset i

F_1 is value of factor 1

F_2 is value of factor 2

F_n is value of factor n

b_{i1} through b_{i1} are the sensitivities of R_i to factor F_1 through Fn
e_i is non factor component of return R_i

The terms in the bracket in equation 1 is the return contribution from style of the fund or the chosen asset classes. The value in equation 2, e_i, is the difference between the return of the equally weighted property fund portfolio and the return of the synthetic portfolio built from different asset classes. According to Sharpe, this value is due to the selection of assets.

To explore the characteristics of property funds in relation to the 4 stock classes, the regression is run under 3 restrictions: First, the portfolio is constructed according to the regression model which best fits the equally-weighted portfolio of property funds. The target portfolio which is built from the different asset classes is the portfolio which has lowest variance of e_i, tracking error which is the difference between the return on the portfolio of equally-weighted property funds and the return of the target portfolio. Each beta coefficient represents weight (in percent) in the portfolio. Second, the total weight must equal to 100%. Third, the portfolio is built under quadratic equation and each beta is restricted to be in the range of 0% to 100% since it is not easy for most Thai investors to take a short position for their investment.

The portfolio created from the different asset classes is the passive portfolio with the same style as the equally-weighted portfolio of property funds. The exposure of portfolio of property funds to each of the different asset classes is, hence, determined by the weight of asset classes in the imitated portfolio. Next, R-square, R^2, is determined with the following equation:

$$R^2 = 1 - \frac{\sum_i^n (R_i - R_{pi})^2}{\sum_i^n (R_i - [\![E(R)]\!]_i))^2}$$ (3)

Where R_{pi} is the Quarterly return of the portfolio built from 12 asset classes.

The R-square represents the portion of variance of Ri which is explained by asset classes and 1 minus R-square, thus, indicates the unexplained portion.

Then, the same steps are pursued but using 12 asset classes including short-term government bond, medium-term government bond, long-term government bond, corporate bond, global bond, developed market bond, emerging market bond, value stock, growth stock,

medium capitalization stock, small capitalization stock, and land. The added 8 asset classes are used as control variables to find the more precise contribution from 4 different stock classes.

Descriptive Statistics Summary

Table 2 shows that the top three mean quarterly returns are that of growth stock class (G_STOCK) at 8.69%, that of the medium capitalization stock class (M_STOCK) at 4.77% and that of value stock class (V_STOCK) at 3.81%, respectively. Meanwhile the top three standard deviations of quarterly returns are that of growth stock class (G_STOCK) at 13.47%, that of value stock class (V_STOCK) at 13.28%, and that of small capitalization stock (S_STOCK) at 11.31%, respectively. Nevertheless, when the standard deviation of quarterly return is measured relatively to their mean return, the top three highest volatile classes are land class (LAND), value stock class (V_STOCK) and global bond class (GLO_BOND), correspondingly. Property fund (PF) has average quarterly return of 1.44%, standard deviation of 3.34%, and coefficient of variation of 2.32.

Table 2 Mean, Standard Deviation, and Coefficient of Variation of the Equally-weighted Property Fund Portfolio's Quarterly Return and 12 Asset Classes' Quarterly Returns

Variables	Mean (%)	Standard Deviation (%)	Coefficient of Variation (%)
S_GOV	0.68	0.28	0.41
M_GOV	0.95	0.20	0.21
L_GOV	1.28	0.20	0.16
COR_BOND	1.12	1.58	1.41
GLO_BOND	1.26	3.02	2.40
EME_BOND	2.16	4.29	1.98
DEV_BOND	1.20	2.81	2.34
V_STOCK	3.81	13.28	3.48
G_STOCK	8.69	13.47	1.55
M_STOCK	4.77	11.31	2.37
S_STOCK	-1.00	8.14	-8.13
LAND	0.47	7.96	16.82
PF	1.44	3.34	2.32

EMPIRICAL FINDINGS

Table 3 shows the correlation coefficient between each pair of asset classes. The correlation coefficients between the portfolio of property funds' (PF) and all stock classes' returns are all statistically significant and relatively higher than the coefficient between PF and other asset returns. The correlation coefficients between PF and other asset returns are positive, except for those between PF and returns of short term government bond, medium term government bond, long term government bond, corporate bond and land (S_GOV, M_GOV, L_GOV, COR_BOND and LAND). These exceptional coefficients are negative and mostly statistically significant.

Within stock asset classes, each pair of stock classes' returns is significantly positive correlated. Perhaps, it is because most stocks' returns are affected by the market sentiment. The correlation coefficients of the pairs of V_STOCK and G_STOCK, V_STOCK and M_STOCK, V_STOCK and S_STOCK are 0.908, 0.803, 0.704, 0.846, 0.736 and 0.901, respectively.

Within bond asset classes, only the pairs of S_GOV and M_GOV, M_GOV and L_GOV are significantly positive correlated at 0.758 and 0.617 sequentially. The correlation coefficients of other bonds' pairs are low and insignificant. The results also show that Thai government bonds are not very much related to corporate bonds and bonds in other country.

Unexpectedly, the land asset class's return (LAND) is not highly correlated to any asset classes' returns. The correlation coefficient between land's return and global bond's return has largest magnitude of -0.344 with statistically significant. The results imply that land price movement is rather independent.

For the insight relationship between property funds and other asset classes using Sharpe (1992)'s model, Figure 1 indicates the return contribution to the equally-weighted property funds' return of only four stock classes' returns including value stock, growth stock, medium capitalization stock and small capitalization stock. The property fund's return is contributed from the small capitalization stock return (S_STOCK) by 90% and the growth stock return (G_STOCK) by 10%. However, the explanatory power (R-square) of the imitated portfolio returns of S_STOCK and G_STOCK is negatively, and therefore, inconclusive.

When 7 bond classes and a land class are added into the imitated portfolio as control variables, the return contribution of stock asset classes to the property funds' returns turn to be less important. The findings in Figure 2 shows that among stock classes, property funds' return is contributed from S_STOCK (13%), M_STOCK (9%) and G_STOCK (4%), respectively. S_GOV, M_GOV, and COR_BOND contributes to the property funds' return by 35%, 32%, and 6%, respectively. The returns of Global bond (GLO BOND), emerging market bond (EME_BOND), developed market bond (DEV_LAND), and land asset class (LAND) have no contribution to the portfolio used to track property funds' return. The R-square of 0.557 suggests that 55.7% of equally weighted property funds' return is explained by the imitated portfolio return.

Table 3 Statistical Summary of Correlation Coefficient of the 12 Asset Classes' Returns During 2003 to 20113

Correlation													
	PF	S_GOV	M_GOV	L_GOV	COR_BOND	GLO_BOND	EME_BOND	DEV_BOND	V_STOCK	G_STOCK	M_STOCK	S_STOCK	LAND
PF	1	-.028	-.080	-.362*	-.111	.098	.379*	.145	.616**	.629**	.718**	.724**	-.154
S_GOV	-.028	1	.758**	.163	.139	-.060	-.197	-.174	-.333*	-.241	-.194	-.229	-.060
M_GOV	-.080	.758**	1	.617**	-.053	-.120	-.117	-.267	-.283	-.299	-.271	-.206	-.023
L_GOV	-.362*	.163	.617**	1	-.200	-.026	.009	-.212	-.146	-.259	-.315*	-.233	-.084
COR_BOND	-.111	.139	-.053	-.200	1	.152	-.077	.126	-.259	-.340*	-.173	-.111	-.135
GLO_BOND	.098	-.060	-.120	-.026	.152	1	.478**	.668**	.286	.253	.129	.111	-.344*
EME_BOND	.379*	-.197	-.117	.009	-.077	.478**	1	.598**	.639**	.537**	.520**	.566**	.023
DEV_BOND	.145	-.174	-.267	-.212	.126	.668**	.598**	1	.414**	.355*	.261	.186	.010
V_STOCK	.616**	-.333*	-.283	-.146	-.259	.286	.639**	.414**	1	.908**	.803**	.741**	.098
G_STOCK	.629**	-.241	-.299	-.259	-.340*	.253	.537**	.355*	.908**	1	.846**	.736**	.070
M_STOCK	.718**	-.194	-.271	-.315*	-.173	.129	.520**	.261	.803**	.846**	1	.901**	.028
S_STOCK	.724**	-.229	-.206	-.233	-.111	.111	.566**	.186	.741**	.736**	.901**	1	-.058
LAND	-.154	-.060	-.023	-.084	-.135	-.344*	.023	.010	.098	.070	.028	-.058	1

* Correlation is significant at 0.05 level (2-tailed) ** Correlation is significant at 0.01 level (2-tailed)

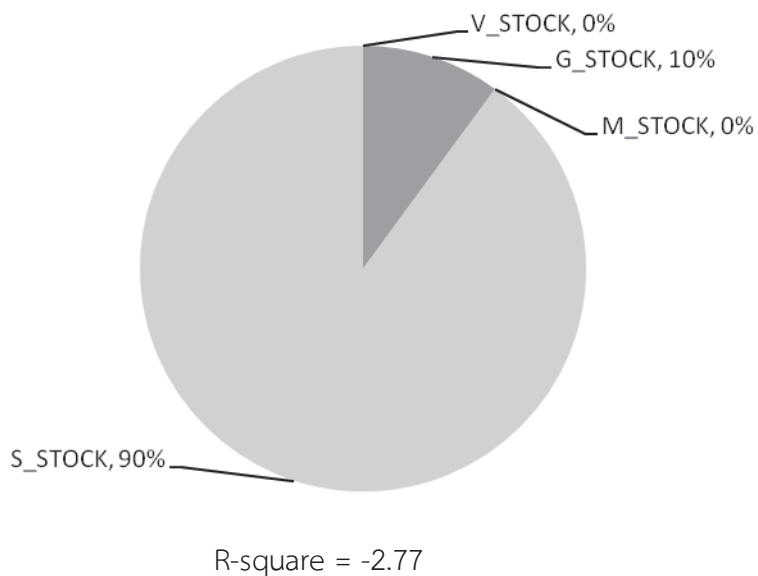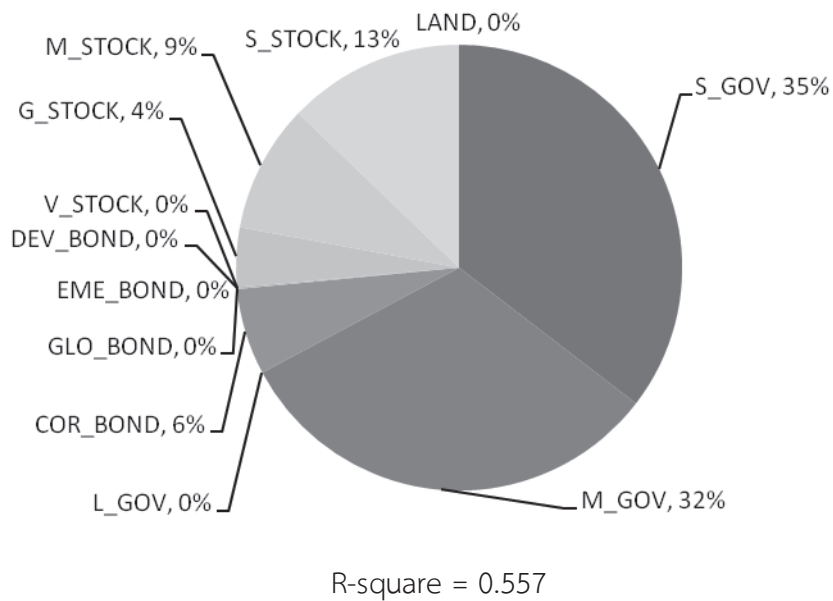**Figure 1** Average Thailand Property Funds' Style during 2003 to 2011 during 2003 to 2011

R-square = -2.77

Figure 2 Average Thailand Property Funds' Style during 2003 to 2011 during 2003 to 2011

R-square = 0.557

CONCLUDING REMARKS

The study explores the relationship between Thai property funds and stock market. The descriptive statistics reveals that when compared with those of twelve asset classes (including short term government bond, medium term government bond, long term government bond, corporate bond, global bond, emerging market bond, developed market bond, value stock, growth stock, medium capitalization stock, small capitalization stock, and land), the return and standard deviation of property fund's are in the middle. The return of property fund is highly correlated with the returns of all classes of common stocks, especially those of small capitalization and medium capitalization stock classes.

By using Sharpe (1992)'s model, the analysis of property fund's return behaviour reveals that when only stock classes are included in the built portfolio, the small capitalization stock return provides most contribution to the portfolio while the growth stock return the rest. Nevertheless, the explanatory power of the imitated portfolio return on the property funds' return is inconclusive.

When bonds and land are used as controlled variables, the stock returns contribute less to the property fund's return but the imitated portfolio return can explain the variance of property funds' return considerably. The small capitalization stock class is still the most important contributor, followed by the medium capitalization stock. Meanwhile the growth stock return's contribution drops to the third. Among bond classes, the short term government bond has the highest weight on the synthetic property fund portfolio, followed by medium term government bond, and corporate bond, respectively. There are no contribution from long term government bond, global bond, emerging market bond, developed market bond, value stock, and land. In overall, stock returns, especially small capitalization stock return, and property funds are related.

Although this study provides more understanding on property funds' return, some important limitations should be addressed for further studies. First, the research data are quite limited because the first property fund in Thailand was in 2003. Second, some property funds' returns might be distorted by the low market liquidity.

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