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CORPORATE REAL ESTATE HOLDING AND IMPACT ON FIRM RETURNS

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Keywords: corporate real estate, pricing, share returns, Fama-MacBeth approach

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ABSTRACT

This paper examines whether corporate real estate of non-property companies affects share returns by using the two-stage Fama-MacBeth approach. The study period is from 1993 to 2001 with a sample of 83 non-property companies listed on Bursa Malaysia. The corporate real estate proxies are obtained from financial statements and are represented by book value of property, first difference in annual book value, property to total tangible asset ratios and property to shareholders' equity.

The pricing is examined in terms of corporate real estate holdings/intensities, by period, year, industry sectors, portfolio and by contemporaneous and lagged property proxies. The use of contemporaneous and lagged property proxies is able to capture better the impact of corporate real estate holdings on share returns.

Overall the results of the study show that corporate real estate has a weak effect on stock returns.

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INTRODUCTION

Firms owned a significant amount of properties in their balance sheets. On average as high as 25% of corporate assets comprises real estate (Zeckhauser and Silverman 1983). Changes in property market, potentially have a direct impact on the value of corporate assets, operating expenditures and the value of firms. If this impact is significant, the real estate market factor must play an important role in stock pricing.

The motivations in investigating real estate as a new risk factor are:

(a) real estate is a major asset class;

(b) real estate is a latent asset (Brennan 1990);

(c) real estate represent a significant portion of assets to many firms.

Thus real estate risk may represent a source of non-diversifiable risk to investors.

Deng and Gyourko (1999) offer several reasons why firms having large property holdings may underperform. Firstly, these companies have underutilized the properties owned. Firms that do not use their property efficiently may not be earning a high risk-adjusted return on their property assets. Secondly, property holdings constitute a poor duration match with the firm's capital needs and product cycle. Thirdly, investors may diversify risk more cheaply on their own. Lastly, investors have little or no idea what property holdings a company has.

Industries which are highly exposed to the property market, particularly banks are found to be very sensitive to changes in real estate returns (He, Myer and Webb, 1996). Banks which have high real estate loan portfolios are exposed to the property market and the impact depends on the composition and size of the property loans.

Objectives of study

The primary objective of this study is to examine the impact of corporate real estate holdings on the share returns of non-property companies for the January 1993 to December 2001 period. This study period is chosen as it coincides with a complete economic and property cycles of boom and bust in Malaysia. This avoids the study to be biased towards a particular phase of the cycles. The study is further divided into two sub-periods: (a) 1992-1996 period which is characterized by strong economic growth and high asset inflation; and (b) 1997-2001 period which reflects financial

crisis, economic recession and recovery phase of the markets after the Asian financial crisis.

This paper contributes to the corporate real estate literature through:

(a) the use of contemporaneous and lagged real estate proxy in examining the impact of corporate real estate on stock prices;
(b) using only companies that remain in their respective industry sectors through out the study period;
(c) examining the effect of Asian financial crisis on the impact of corporate real estate on stock prices.

LITERATURE REVIEW

Several research studies have been conducted to examine the relationship between firm returns and the degree of real estate ownership. To assess the pricing of corporate real estate, (a) the capital asset pricing model and (b) arbitrage pricing theory are commonly used.

Pricing of Corporate Real Estate using Capital Asset Pricing Model

The capital asset pricing model (CAPM) implies a linear relation between expected returns and market betas which completely explain the cross section of expected returns. This can be tested by using a cross-sectional regression methodology which are first developed by Fama and MacBeth (1973). The Fama-MacBeth approach is particularly useful in assessing the pricing of real estate due to its flexibility to accommodate additional risk factors.

In Korea, Cheong and Kim (1997) examined the relationship between real estate holdings and share returns and systematic risk by using a cross-sectional analysis for 1987 to 1991 period. Their results did not find any positive effect of real estate holdings on share returns. They found that when a firm takes up more debt for real estate, the firm would suffer from the loss of growth opportunity. The weakness in their study is the use of book value of land as the proxy for real estate intensity.

Deng and Gyourko (1999) examined 718 US companies in 57 industries for the 1984-1993 period. By using the two stage least square (2SLS) techniques, they find that firms with high real estate ownership and high risk have lower returns.

In Singapore, Liow (2001a) by using the Fama-MacBeth approach on 71 non-real estate firms found that corporate real estate is a factor affecting capital asset pricing. The results suggest a positive relationship but a weak effect between real estate and firm valuation. The empirical results appear inconclusive. The study period covers the 1995-1999 period, however, the effect of the Asian financial crisis on pricing has not been investigated.

Liow (2001a) found that while the proportion of real estate holdings does affect positively rates of share returns, the results need careful interpretation as real estate also impacts on other firm variables such as debt ratio and firm size.

Pricing of Corporate Real Estate using Arbitrage Pricing Theory

The arbitrage pricing theory was introduced by Ross (1976) as an alternative to the capital asset pricing model. Unlike the CAPM, arbitrage pricing theory (APT) does not require the identification of the market portfolio and it is a multi-factor asset pricing model. APT has been used to identify risk factors that affect stock returns.

There are two basic categories i.e. statistical and theoretical in specifying the factors in APT. The statistical approaches involve identifying factors and factor loadings by using a maximum likelihood factor analysis. Two primary statistical techniques are used in forming factor portfolios i.e. factor analysis and principal components analysis.

Liow (2002) use principal component analysis to estimate the factor structure of stock returns of 51 Singapore firms for the 1989 to 1998 period. The multiple regression method is used to investigate the relationship between the factors derived from the principal component analysis i.e. the stock market, property sector and property market return. Liow (2002) found a significant relationship between property intensive company and the three factors.

The theoretical approach for selecting factors involve specifying macroeconomic and financial market variables that capture economy-wide systematic risks. Chen, Roll and Ross (1986) use macroeconomic variables such as yield spread, expected and unexpected inflation, industrial production growth as factors.

The pre-specification approach have been used by Liow (1997, 2001b) and Ong and Yong (2000) to investigate whether real estate is a factor that explain stock pricing in the stock market.

Ong and Yong (2000) use a six-factor arbitrage pricing theory model and shows that real estate exposure is priced as the property premia is significant. The property risk premium for property intensive non-property companies is higher compared to low property intensive non-property companies. Their findings also show that real estate intensity can be regarded as a proxy for property exposure.

A second way to select factors is by specifying characteristics of firms which help explain differential sensitivity to the systematic risks and then form portfolios of stocks based on these characteristics. Among the firm characteristics commonly used include market value of equity, price-to-earnings ratio and ratio of book value of equity to market value of equity. An example of this type of approach is that used by Fama and French (1993) who have specify firm characteristics to form factor portfolios.

Hsieh and Peterson (2000) examine 53 industry portfolios for the January 1972 to December 1995 period to see whether the coefficients of the market portfolio and real estate factors explain cross-sectional returns. By using an extended Fama-French model that incorporates a real estate factor, their results show that none of the factors exhibits explanatory power.

He (2002) investigates whether the real estate factor explains excess returns on US industrial stocks for the January 1963 to December 1997 period. He (2002) found the real estate factor is able to explain excess returns in industrial stocks. The real estate factor is found to be quite stable for the sub-period. The coefficient of the stock market factor declines when the real estate market factor is included in the model.

Among the various studies, only Seiler et al. (2001) and Cheong and Kim (1997) do not find real estate being a priced factor affecting share returns. Seiler et al. (2001) examined eighty companies to assess the effect of real estate on the risk and return of shares by using a two-stage least square equations covering the 1985 to 1994 period. Their study failed to support the hypothesis that corporate real estate provide diversification benefits in terms of systematic risk and risk adjusted returns.

The failure to detect any influence of real estate is probably due to the use of inappropriate proxy for real estate intensity. In the case of Cheong and Kim (1997), they probably have under-represented real estate intensity by using the book value of land as proxy for real estate intensity. On the other hand, Seiler et al. (2001) have used property, plant and equipment instead of just real estate holdings.

RESEARCH DESIGN

Research Method

Many listed non-real estate companies invest significantly in real estate. To determine whether corporate real estate intensity affect positively stock returns, a two stage regression technique similar to that of Fama and MacBeth (1973) is used. Similar property pricing studies have also used the Fama-MacBeth approach (e.g. Deng and Gyourko, 1999 and Liow, 2001a). The Fama-MacBeth approach is adopted because it can be modified to accommodate additional risk variables beyond the CAPM beta. By adding a non-diversifiable risk measure such as corporate real estate, the regression is augmented to investigate if corporate real estate has explanatory power not captured by the market beta.

Firstly, using the capital asset pricing model framework, the market model is used to estimate the beta of a company:

$$R_{jt} = a_j + ß_j R_{mt} + e_j$$

where

R_{jt}	=	monthly returns on security *j*
a_j	=	intercept term for security *j*
$ß_j$	=	beta for security *j*
R_{mt}	=	return on market portfolio proxied by the KLCI
e_j	=	error term

As the real estate proxy is based on book values in the balance sheets which are not updated regularly through property revaluations, the regressions are adjusted for first-order autocorrelation errors.

In the second stage regression, a cross-sectional regression for each firm is carried out for the next period which used the estimated beta and a real estate intensity variable:

$$R_{jt} = \lambda_0 + \lambda_1 ß_{jt} + \lambda_2 (\text{real estate proxy})_{jt} + e_{jt}$$

where

R_{jt}	=	annual returns on security *j*
λ_0	=	intercept term for security *j*
$ß_{jt}$	=	beta coefficient estimated from the first regression
λ_2	=	regression coefficient of the real estate intensity proxy
e_j	=	error term

The real estate proxy would represent the real estate intensity of the corporate real estate holdings of non-real estate companies. The proxy can be represented in absolute and relative terms. Balance sheet values of real estate would represent the absolute terms of real estate holdings. In relative terms, real estate intensity can be represented by ratios e.g. property/total tangible assets, property holding/shareholders' equity funds etc.

The CAPM is regarded as a well specified model for the real estate variable if λ_2 is not statistically different from zero. This would means real estate is an important variable in the return generating structure of non-real estate firms.

Considering errors of a market model and estimation errors of beta, the general least square (GLS) and maximum likelihood estimation (MLE) methods have been used to improve estimation. However Cheong and Kim (1997) found the application of GLS and MLE did not improve the estimation results and in some cases the estimation coefficients were shown to be insignificant. Hence only the ordinary least square method (OLS) has been applied in this study.

Industry sectors with five or more firms in the same industry for which continuous data was available were used in the study. Four industry sectors over the study period from 1993 to 2001 met these requirements.

To assess the stability of the real estate factor in stock returns and to improve the efficiency of estimation, portfolios are formed based on real estate intensity. Firms are sorted into three portfolios based on their level of real estate ownership. The first portfolio would contain those firms that had the highest real estate intensity followed by the medium and low intensity portfolios.

For firms that owned significant real estate or suppliers of real estate services, the ex ante expectations are that the returns of these firms should be positively correlated with the real estate factor. Examples of such firms are those in the consumer sector (e.g. breweries, furniture and fittings, animal feed), plantation sector (e.g. oil palm, rubber estate), industrial products sector (e.g. building materials, gas, oil, chemicals) and finance sector (e.g. banks, insurance and financial services companies).

On the other hand for firms that own little real estate, the returns of firms are likely to be negatively related to the real estate factor. Examples of these industries are those in the transportation, retail and shipping industries.

To proxy property intensity, a ratio of book value of property to total tangible assets is used following Deng and Gyourko (1999) and Liow (2001a) to reduce potential endogeneity problems that can bias the estimations.

The historical cost convention is used when accounting for land and buildings in the financial statements. To overcome the problem of historical book value of land and buildings being used in the pricing regressions, the real estate proxies are lagged one period. Cross-sectional regressions are run using contemporaneous and lagged real estate proxies to examine the impact on share returns.

Research Sample and Data

The data set used in this study are companies in the non-property sectors of Bursa Malaysia for the 1993 to 2001 period. The Property and Property Trust Sectors are excluded from the study as the companies in these sectors are involved primarily in property development and investment activities. Banks, finance and insurance companies are also excluded from the study as the financial statements are prepared according to financial and regulatory requirements which are different from the normal balance sheet format.

Monthly closing prices are obtained from Bursa Malaysia for each of the selected companies. Companies which do not have sixty consecutive monthly returns data for the past five years of the 1993-2001 period are excluded from the sample. Each firm must have balance sheet information about property holdings, property, plant and equipment, total assets, total tangible assets and total shareholders' equity.

Data on land and buildings are collected from the balance sheets of the annual reports of each listed companies for the 1993 to 2001 period. Annual reports containing the balance sheets are found in Bursa Malaysia and Securities Commission libraries. Annual reports from 1999 onwards are also accessible from the respective web-sites of the listed companies. Data are also supplemented by *Annual Companies Handbook* and *Investors Digests* both published by Bursa Malaysia.

To detect data entry errors, summary statistics especially of minimum and maximum values are computed to help in detecting extreme data values i.e. very small or large values. Any data that is three standard deviations from the mean is suspected as outliers. The data is firstly checked for recording error or error in data entry. If the data is correct, the next step is to consider the background of the companies concerned.

Some of these outliers are caused by companies with poor financial conditions after the Asian Financial Crisis which are classified by Bursa Malaysia as Practice Note 4 (PN4) companies. In these situations the companies concerned are excluded from further analysis.

In cases where data is missing then the sample will be dropped from the analysis if the data concerned is not available or reported in the financial statements.

After the data selection process, a sample of 83 companies is obtained. The pooled sample contains 747 (83 companies x 9 years of annual data points) observations.

RESULTS

This section reports the regression results on whether real estate affects share returns using real estate proxies represented by book value of property in the financial statements, first difference in annual book value, property to total tangible asset ratios and property to shareholders' equity. Regressions were run using the two-stage Fama-MacBeth regression approach. The analyses were done by real estate holdings, period, year, industry sectors, portfolio and contemporaneous and lagged level. Lastly, analyses are also conducted at the portfolio levels.

Cross-sectional Results by Real Estate Holdings

Table 1 shows the results of the cross-sectional regression on 83 companies for the 1993-2001 sample period. The coefficient for the first difference in annual property book value is -0.01567 with t-statistic of -2.064. The coefficient is significantly different from zero at 0.05 level.

The result implies that the annual change in book value has a significant negative impact on share returns. Investors are using information on the difference in annual book value to assess the share price value of firms.

Table 1: Cross-sectional Regression Result: Real Estate Proxy ($?_2$).

Regression equation: $R_{jt} = ?_0 + ?_1ß_{jt} + ?_2(\text{real estate proxy})_{jt} + e_t$

Regression	$?_1$ (Beta) coefficient (t-statistics)	$?_2$ coefficient (t-statistics)
1	-0.14736 (-1.986**)	-0.68051E-04 (-0.2672)
2	-0.12934 (-1.760*)	**-0.15676E-01 (-2.064**)**
3	-0.15272 (-2.053**)	-0.80224E-01 (-0.6673)
4	-0.29451 (-5.886****)	0.32616E-01 (0.4630)

Note: Significance at the 0.1 (*), 0.05 (**), 0.01(***) and 0.001(****) level.
Regression 1 : Real estate proxy is book value of property.
Regression 2 : Real estate proxy is first difference in annual property book value.
Regression 3 : Real estate proxy is Property to Total Tangible Asset.
Regression 4 : Real estate proxy is Property to Shareholders' equity.

The coefficients of book value of property, property to total tangible asset ratio and property to shareholders' equity ratio are not statistically significant at any levels. The results indicate that real estate intensities represented by book value of property, percentage of property to total tangible asset and percentage of property to shareholders' equity do not affect share returns. This imply that the information on book value of property, percentage of property to total tangible asset and percentage of property to shareholders' equity are not useful to investors in evaluating the share price of these firms.

Cross-sectional Results by Period

To investigate whether corporate real estate holdings affect risk and returns of shares during different economic conditions, the samples are tested for the period before and after the Asian financial crisis.

Table 2: Cross-sectional Regression Results by Period: Real Estate Proxy ($?_2$).

Regression equation: $R_{jt} = ?_0 + ?_1ß_{jt} + ?_2(\text{real estate proxy})_{jt} + e_t$

Regression	Period	N	$?_1$ (Beta) coefficient (t-statistics)	$?_2$ coefficient (t-statistics)
1	1994 – 1996	249	0.29355E-01 (0.3446)	-0.68016E-04 (-0.1962)
	1997 -2001	415	-0.26716 (-2.517**)	-0.29188E-04 (-0.8689E-01)
2	1994 – 1996	166	0.12214 (1.2610)	-0.42575E-02 (-0.4744)
	1997 -2001	415	-0.26622 (-2.508**)	-0.12528E-04 (-0.1231E-02)
3	1994 – 1996	249	0.31986E-01 (0.3824)	-0.14451E-01 (-0.1119)
	1997 -2001	415	-0.27947 (-2.610***)	-0.12932 (-0.7265)
4	1994 – 1996	249	0.33862E-01 (0.4105)	-0.44785E-01 (-0.4808)
	1997 -2001	415	-0.58741 (-8.862****)	0.14266 (1.542)

Note: Significance at the 0.1 (*), 0.05 (**), 0.01(***) and 0.001(****) level.
Regression 1 : Real estate proxy is book value of property.
Regression 2 : Real estate proxy is first difference in annual property book value.
Regression 3 : Real estate proxy is Property to Total Tangible Asset.
Regression 4 : Real estate proxy is Property to Shareholders' equity.

The results in Table 2 show that none of the t-statistic of the coefficients of the real estate proxies are significantly different from zero. This implies that corporate real estate holdings do not affect share returns under good or poor economic conditions.

This result has to be interpreted in a cautious manner as the study period is relatively short. For example the buoyant period is from 1990 to 1996 whilst the study period is only three years from 1994 to 1996. If a longer study period is used, the results might differ.

The signs of the beta coefficients for the four regressions are negative for the crisis period. This implies that bearish stock market condition in 1997-2001 is reflected in the betas.

Cross-sectional Results by Year

Table 3 and 4 shows the yearly cross-sectional results. For the property to total tangible asset ratio (refer Table 3), the coefficient of the real estate proxy for the year 1997 is 0.5464 with t-statistic of 1.823 and is significantly different from zero at the 0.1 level.

Table 3: Cross-sectional Regression Results by Year: Real Estate Proxy ($?_2$) Represented by Property/Total Tangible Asset.

Regression equation: $R_{jt} = ?_0 + ?_1ß_{jt} + ?_2(\text{real estate proxy})_{jt} + e_t$

Year	n	$?_1$ (Beta) coefficient (t-statistics)	$?_2$ coefficient (t-statistics) Property/Total tangible asset
1994	83	-0.22251 (-1.626)	0.38591E-01 (0.1735)
1995	83	0.86035E-01 (0.5651)	-0.16633 (-0.7673)
1996	83	0.31332E-01 (0.3053)	0.12485 (0.7992)
1997	83	-0.66665 (-3.200***)	**0.54648 (1.823*)**
1998	83	0.61119 (5.206****)	0.19603 (0.9701)
1999	83	0.12718 (0.7072)	-0.44761 (-1.609)
2000	83	-0.34632 (-2.432**)	-0.47537E-01 (-0.2293)
2001	83	-0.12388 (-0.8402)	-0.77695E-01 (-0.3182)

Note: Significance at the 0.1(*), 0.05 (**), 0.01(***) and 0.001(****) level.

The results imply that in the year 1997, the percentage of property to total tangible asset is a factor affecting share return. This means investors are making use of the property to total tangible asset percentage as a significant information in assessing the share price of companies.

Mera and Renaud (2000) found real estate plays a significant role in the Asian financial crisis. The year 1997 is the year when the Asian financial crisis started. The percentage of property to total tangible asset provides valuable information on the real estate intensities of firms. Since Asian firms are exposed to higher real estate intensities (Liow and Ooi 2004), investors have used the property/total tangible asset information to evaluate share prices.

For the property to shareholders' equity ratio (refer Table 4), the coefficient of the real estate proxy for the year 2000 is 0.2074 with a t-statistic of 2.089. The coefficient for the real estate proxy is significantly different from zero at 0.05 level. The result indicates that for the year 2000, the percentage of property to shareholders' equity is a significant factor affecting share returns.

Table 4: Cross-sectional Regression Results by Year: Real Estate Proxy ($?_2$) Represented by Property/Shareholders' Equity.

Regression equation: $R_{jt} = ?_0 + ?_1 ß_{jt} + ?_2(\text{real estate proxy})_{jt} + e_t$

Year	n	$?_1$ (Beta) coefficient (t-statistics)	$?_2$ coefficient (t-statistics) Property/Shareholders' equity
1994	83	-0.22715 (-1.697*)	0.97504E-02 (0.6618E-01)
1995	83	0.10106 (0.6761)	-0.14488 (-0.8319)
1996	83	0.25188E-01 (0.2400)	0.18669E-01 (0.1624)
1997	83	-0.6336 (-3.037***)	0.36748 (1.531)
1998	83	0.60061 (5.116****)	0.57009E-01 (0.4507)
1999	83	0.19034 (1.124)	-0.18596 (-1.579)
2000	83	-0.32580 (-2.410**)	**0.20736** **(2.089**)**
2001	83	-0.85477E-01 (-0.6073)	0.8844E-01 (0.7794)

Note: Significance at the 0.1 (*), 0.05 (**), 0.01(***) and 0.001(****) level.

Generally, these results indicate that the effect of real estate holdings on the stock returns is generally regarded to be weak in the Malaysian stock market for the 1994-2001 year period.

Cross-sectional Results by Industry Sectors

Different industries have different real estate holdings due to operational characteristics of their own. To investigate the industry effect, the sample is grouped according to industry sectors.

Table 5 shows the regression results by industry sectors. Panel A of Table 5 shows that none of the coefficients of the real estate proxy represented by property to total tangible asset ratio are significant at any level. The results indicate that the percentage of property to total tangible asset has no effect on the share returns of companies grouped by industry sectors.

Table 5: Cross-sectional Regression Result by Industry Sectors: Real Estate Proxy ($?_2$) Represented by Property/Total Tangible Asset and Property/Shareholders' Equity.

Regression equation: $R_{jt} = ?_0 + ?_1ß_{jt} + ?_2(\text{real estate proxy})_{jt} + e_t$

Sectors	n	**Panel A** **Real estate proxy: Property/Total tangible asset**		**Panel B** **Real estate proxy: Property/Shareholders' equity**	
		$?_1$ (Beta) coefficient (t-statistics)	$?_2$ coefficient (t-statistics)	$?_1$ (Beta) coefficient (t-statistics)	$?_2$ coefficient (t-statistics)
Consumer	176	-0.28758 (-1.926*)	-0.99096E-01 (-0.2768)	-0.27731 (-1.847*)	-0.11969 (-0.6470)
Industrial	216	-0.9455E-01 (-0.6331)	-0.80956E-01 (-0.1826)	-0.15369 (-1.551)	**0.45305 (3.228***)**
Plantation	120	0.14003E-01 (0.9692E-01)	-0.14515 (-0.8608)	0.25294E-02 (0.1754E-01)	0.94156E-01 (0.9071)
Trading	112	-0.17022 (-1.019)	-0.29510 (-0.9792)	-0.16442 (-1.415)	-0.82006E-01 (-0.5287)
Second Board	40	-0.68901E-01 (-0.1462)	0.13932 (0.1214)	-0.16417 (-0.3624)	0.41300 (0.8019)

Note: Significance at the 0.1 (*), 0.05 (**), 0.01(***) and 0.001(****) level.

However for the property to shareholders' equity ratio (refer Table 5, Panel B), the coefficient for the Industrial Sector is 0.45305 with a t-statistic of 3.228. The coefficient is significantly different from zero at the 0.01 level. In addition, the Industrial Sector, Plantation Sector and the Second Board report a positive sign real estate coefficient in three out of the five regressions. The positive sign indicate positive relationship between real estate proxies and industry sectors. Due to the nature of their business, firms in the Second Board, Industrial and Plantation Sector and Second Board own significant real estate.

Firms in the Plantation Sector in particular rely on land as an input to increase its output. Thus a positive relationship is expected between percentage of property to shareholders equity and the Plantation Sector.

Cross-sectional Results by Portfolio

Three portfolios are formed out of the sample and Table 6 shows the result by portfolio. Portfolio 1 of Regression 2 has a coefficient of -0.7216 with a t-statistic of -3.136 and thus is statistically different from zero at the 0.01 level. The result indicate that the share returns of companies with high level of property ownership are affected by the annual change in property book value and are not affected by the book value of property, percentage of property to total tangible assets and percentage of property to shareholders equity.

None of the regressions for Portfolio 2 has coefficients which are statistically significant at any level. The results show that the share returns of companies with average level of real estate intensities are not affected by any of the four real estate proxies.

The coefficient for Portfolio 3 of regression 3 has a value of -0.9247 with a t-statistic of -1.664. The coefficient is significantly different from zero at 0.1 level. The results indicate that the share returns of companies with low real estate intensities are affected by the percentage of property to total tangible asset. Investors are using the information on the percentage of property to total tangible asset to assess the share prices of these firms.

Table 6: Cross-sectional Regression by Three Portfolios According to Their Average Property Asset Intensity : Real Estate Proxy ($?_2$). Average Property Asset Intensity of Portfolios: Portfolio 1 (46%), Portfolio 2 (21%) and Portfolio 3 (12%).

Regression equation: $R_{jt} = ?_0 + ?_1ß_{jt} + ?_2(\text{real estate proxy})_{jt} + e_t$

Reg.	Portfolio 1 (n=27)		Portfolio 2 (n=28)		Portfolio 3 (n=28)	
	$?_1$ (Beta) coefficient (t-statistics)	$?_2$ coeff. (t-statistics)	$?_1$ (Beta) coefficient (t-statistics)	$?_2$ coeff. (t-statistics)	$?_1$ (Beta) coefficient (t-statistics)	$?_2$ coeff. (t-statistics)
1	-0.66363E-01 (-0.5340)	0.60547E-04 (0.2983)	-0.15315 (-1.218)	-0.1448E-03 (-0.3093)	-0.20921 (-1.490)	0.55568E-03 (1.511)
2	-0.77366E-01 (-0.5575)	**-0.72164E-01 (-3.136***)**	-0.14919 (-1.033)	0.63303E-02 (0.5119)	-0.21139 (-1.358)	0.84044E-02 (-0.6970)
3	-0.70761E-01 (-0.5696)	-0.92212E-01 (-0.4885)	-0.15555 (-1.241)	0.25131 (0.6433)	-0.21834 (-1.558)	**-0.92475 (-1.664*)**
4	-0.71856E-01 (-0.5783)	0.6544E-01 (0.5584)	-0.15314 (-1.222)	0.11615 (0.8533)	-0.34577 (-3.451****)	0.18436 (0.7153)

Note: Significance at the 0.1 (*), 0.05 (**), 0.01(***) and 0.001(****) level.
Regression 1 : Real estate proxy is book value of property.
Regression 2 : Real estate proxy is first difference in annual property book value.
Regression 3 : Real estate proxy is Property to Total Tangible Asset.
Regression 4 : Real estate proxy is Property to Shareholders' equity.

Cross-sectional Results by Contemporaneous and Lagged Real Estate Proxies

Finally, the same sample is analysed by contemporaneous and lagged real estate proxies. Table 7, Panel A, shows that the contemporaneous property book value has a coefficient of 0.0002 with a t-statistic of 3.34 which is significantly different from zero at the 0.001 level. The lagged property book value has a coefficient of -0.00025 with t-value of -3.02 which is significantly different from zero at the 0.01 level. The results show that the contemporaneous and lagged book value of property have a significant effect on share returns.

Table 7, Panel C, shows that the contemporaneous and lagged percentage of property to total tangible assets affects share returns. For the contemporaneous and lagged property to total tangible asset ratios, the coefficients are 0.6432 and -0.5884 respectively with t-statistic of 3.58 and -3.33 which is significantly different from zero at the 0.001 level.

Table 7, Panel B and D, shows that the first difference in annual property book value and the percentage of property to shareholders equity do not affect share returns.

The results indicate that the book value of property found in balance sheets and the percentage of property to total tangible assets are good proxies to corporate real estate owned by listed companies.

Table 7: Cross-sectional Regression Results: Real Estate Proxy Represented by Property Book Value, First Difference in Annual Property Book Value, Property/Total Tangible Asset and Property/Shareholders' Equity.

Regression equation: $R_{jt} = ?_0 + ?_1ß_{jt} + ?_2(\text{real estate proxy}_t)_{jt} + ?_3(\text{real estate proxy}_{t-1})_{jt} + e_t$

		Real Estate Proxy			
	n	**Panel A Book value of property**	**Panel B Property difference**	**Panel C Property/ total tangible assets**	**Panel D Property/ Shareholders' equity**
$?_1$ (Beta) coefficient (t-statistics)	664	-0.287638 (-6.11****)	-0.007665 (-0.217)	-0.0266176 (-0.774)	-0.0125647 (-0.368)
$?_2$ coefficient (t) (t-statistics)	581	**0.0002579 (3.34****)**	-0.0122668 (-0.240)	**0.643299 (3.58****)**	0.0153245 (0.132)
$?_3$ coefficient (t-1) (t-statistics)	664	**-0.0002514 (-3.02***)**	-0.0415063 (-1.09)	**-0.588412 (-3.33****)**	0.0240931 (0.203)
Constant Coefficient (t-statistics)	664	0.08385 (1.69*)	-0.137922 (-3.50****)	-0.155762 (-3.39****)	-0.172183 (-3.61****)

Note: Significance at the 0.1 (*), 0.05 (**), 0.01(***) and 0.001(****) level.

In addition, regressions that use contemporaneous and lagged book value and percentage of property to total tangible assets are able to overcome the weakness of the lack of current market value of land and buildings in balance sheets that adopt the historical cost accounting convention. Such regressions provide better information about the impact of real estate intensities on share return. For example the book value of property is not a factor affecting share return as reported in Table 1 and 2. However the book value of property becomes a significant factor affecting share return when the contemporaneous and lagged book value are run together in a regression.

CONCLUSION

Since corporate real estate constitutes a significant portion of a company's balance sheet, this study has examined whether corporate real estate is a factor affecting share returns using a two-stage Fama-Macbeth regression methodology. The real estate proxies are book value of property, first difference in annual property book value, percentage of property to total tangible assets and property to shareholders equity. The analyses were carried out based on real estate intensities, period, year, industry sectors, portfolios and by contemporaneous and lagged real estate proxies.

The regression results are:

(a) Real estate intensities

Only the first difference in annual property book values is significant;

(b) By period

None of the coefficients are statistically significant;

(c) By year

For the percentage of property to total tangible assets, only year 1997 is statistically significant. For the percentage of property to shareholders equity, only year 2000 is statistically significant.

(d) By industry sectors

For the percentage of property to total tangible assets, none of the sectors are statistically significant.

For the percentage of property to shareholders equity, only the Industry sector is statistically significant.

(e) By portfolio

For the high real estate intensity portfolio, only the first difference in annual property book value is statistically significant.

For the average real estate intensity portfolio, none of the real estate proxies are statistically significant.

For the low real estate intensity portfolio, only the percentage of property to total tangible assets is statistically significant.

(f) By contemporaneous and lagged real estate proxies

For the real estate proxies represented by the book value of property and percentage of property to total tangible assets, the coefficients for both proxies are statistically significant.

The coefficients for the first difference in property book value and property to shareholders equity are not statistically significant.

The results of the analyses on corporate real estate pricing appear inconclusive as real estate holding is found to have a weak effect on stock returns. The results are consistent with the findings of Seiler et al. (2001) and Liow (2001b).

One possible reason for the weak effect is due to the historical cost accounting adopted by firms in Malaysia. The properties in the balance sheet are not updated regularly by revaluations to reflect current market value. This can be seen from the regression results using contemporaneous and lagged real estate proxies whereby the coefficients of the book value and property to total tangible asset ratios are statistically significant. This implies that investors are not able to infer better information from the corporate real estate holdings reported in the balance sheets.

None of the real estate proxies emerge as the most appropriate representation for real estate intensities. The results are consistent with comparable studies in Singapore and the United States.

This implies that investors are not able to infer better information from the corporate real estate holdings reported in the financial statements where the historical cost accounting convention has been adopted by most listed companies in Malaysia. Under this convention, land and buildings in financial statements are not updated regularly through real estate revaluations to reflect market values. The implementation of International Financial Reporting System (IFRS) for Malaysian companies in 2006 will apply the fair value concept for real estate and this may overcome this problem for similar studies in the future.

The lack of a significant positive relationship between the real estate intensities and excess returns may explain why non-property companies do not manage corporate real estate as a profit centre. Since corporate real estate intensities do not affect share returns, non-property firms are likely to own properties for other reasons. Due to the heterogeneous nature of corporate real estate which covers a wide spectrum of industries, it would be difficult to generalize the reasons why non-property firms own significant amount of land and buildings. Some of the possible explanations are corporate real estate is used as a factor of production, ownership allow flexibility in usage and to maintain control over the properties.

Most companies would purchase properties through financing. There could be an effect of financial gearing on systematic risk and corporate real estate. Future studies may examine the impact of gearing on real estate holdings and firm returns.

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