THE ABNORMAL RETURN PERFORMANCE OF SINGAPORE PROPERTY COMPANIES

LIOW KIM HIANG
Department of Real Estate
National University of Singapore

ABSTRACT

This study provides an empirical investigation of time-varying abnormal return performance of Singapore property companies between 1990 and 1999, an eventful period when the local stock and property markets were affected by strong economic growth, anti-speculation curbs on residential property market and the Asian economic crisis. The study fails to detect any superior abnormal return performance in the property stock market. However, there is some evidence that the abnormal returns in the physical property and property stocks are linked. The property investment implications arising from the study are also evaluated.

Keywords: Property stocks, abnormal returns, time-varying modified Jensen index, Kalman filter, property market, Singapore

INTRODUCTION

In this study, we examine the time-varying risk-adjusted investment performance of 17 Singapore traded property companies in the period 1990 to 1999. Since the late eighties, the strong performance of physical properties has been translated into higher profits and better performance return for many traded property stocks. Moving in tandem with economic growth, the physical property market registered an annual capital appreciation of 48.4% between 1992 and 1996. The majority of listed property firms were able to reap substantial development profits from the residential property market. The listed property stock price index reported an annual increase of 12.5% over these years. However, the government's policy to introduce several anti-speculation measures on residential property market in May 1996[1] and the Asian economic crisis that hit the Singapore economy in July 1997 have caused prices of different property sectors and the property stock market to decline substantially. The volatility in property stock returns was also higher during this eventful period.

From an international perspective, this research is significant given that the real estate literature is rich with respect to the risk-return performance of securitised property investment vehicles such as Real Estate Investment Trusts (REITs) and property stocks. These studies include Titman and Warga (1986), Gyourko and Keim (1990),

[1] On 14 May 1996, the Singapore government introduced a series of anti-speculation measures to cool down the private residential property market. These measures include a tax levied on gains from sale of property within the first three years of purchase, additional stamp duties, a limit to housing loans to 80% of property value and a restriction on granting Singapore dollar loans to permanent residents and foreigners. The curbs affected all sectors of the property market (residential, commercial and industrial) significantly.

Kapplin and Schwartz (1995), Glascock and Davidson (1995), Han and Liang (1995), Matysiak and Brown (1997), Liow (1997) and Liow (2001). However, it is not the intention of this paper to repeat the literature. Employing traded REIT or property stock returns over different data periods, several risk-adjusted performance measures can be computed. They include the simple coefficient of variation, Sharpe index, Treynor index and Jensen abnormal return index. Although these indices measure the investment performance of the asset portfolios from different risk perspectives (e.g. total risk, systematic risk), in general, portfolio A is considered to significantly outperform portfolio B or the general market if the Sharpe, Treynor and Jensen indices of portfolio A are significantly better than those of B or the market. At the same time, portfolio A is expected to command a lower coefficient of variation.

In the Singapore stock market, Liow (1997) provided a comprehensive analysis on the long-term investment performance of the listed property firms. Analyzing the various performance indices listed above, the empirical results indicate that property companies performed poorer on a risk-adjusted basis than the market for the period 1975 through 1995 (21 years). In addition, property firms' performance was found to closely tie to the physical property market. Lastly, property firms in general failed to provide *ex-post* inflation protection. Recently, the risk-adjusted investment performance (including one-factor time-varying Jensen abnormal return) of the Singapore real estate sectors (all-property, residential, commercial and industrial sub-markets) were evaluated against the stock market and property stock sector over the past 25 years in Liow (2001).

Given the dynamics observed in the listed property sector in the 90's, this study is thus motivated to the research in this direction by examining the time-varying risk-adjusted performance of the property company shares. The present paper seeks to update the study of Liow (1997, 2001) and expand on existing research from a different perspective. Specifically, there are three major contributions. First, the paper focuses on the eventful period of 1990 to 1999, where the Singapore property and property stock markets were affected by strong economic growth, anti-speculation curbs on the residential property market and the Asian economic crisis. Property stock prices during this period were much more volatile than the general market. The expectation is that the risk-return profiles of the property companies during this 10-year period could be different from that in the longer-term period.

Second, the paper is the first in the Singapore real estate literature to develop a modified time-varying Jensen index (MJI), based on a two-factor model, to evaluate the abnormal returns of individual property companies. Essentially, the MJI measure considers changing market risk and potential variations in investment betas over the period 1990-1999. In doing so, a more appropriate profile of individual companies' (real) abnormal investment performance emerges.

Finally, a reassessment of the relationship between individual property stocks (and aggregate property stock index) and direct properties appear in this study. In contrast with previous studies that use return measures, this study looks for evidence of whether the respective risk-adjusted returns in the two property markets (i.e. securitised and unsecuritised) relate in a similar manner. The results of the analysis may further shed light into the ongoing debate regarding the risk-adjusted

performance of direct real estate and individual property stocks in the international context.

RESEARCH DESIGN

Methodology

In contrast to the single index market model that has often been employed to estimate abnormal return performance, a modified Jensen index (MJI) is derived from a two-factor model that incorporates a market and an inflation factor. Specifically, the MJI examines excess security return relative to the excess return on the market portfolio and the rate of inflation. The index is the intercept in equation (1):

$$R_{i,t} - R_{f,t} = \alpha_{i,t} + \beta_{i,t}(R_{m,t} - R_{f,t}) + \theta_i (INF_t - R_{f,t}) + \mu_{it} \qquad (1)$$

The term, $R_{i,t} - R_{f,t}$ is the excess return on security i and the risk-free rate, $R_{f,t}$, is known at the beginning of period t. $R_{m,t}$ is the return on the market portfolio, and INF_t is the rate of inflation in period t as measured by the CPI. $\alpha_{i,t}, \beta_{i,t}$ are the measure of abnormal performance and market risk respectively and are assumed to follow the following discrete stochastic process:

$$\alpha_{i,t} = \alpha_{i,t-1} + \eta_t \qquad (2)$$

$$\beta_{i,t} = \beta_{i,t-1} + \omega_t \qquad (3)$$

Equations (2) and (3) allow for time variations in the abnormal return and market risk. In essence, they imply that the coefficients in (1) follow a random walk, which is the usual assumption under the weak form of market efficiency. This time-varying formulation is required to recognize that the equity beta and potential abnormal performance of property companies are likely to vary over time due to high gearing profiles of many property companies and other factors, such as illiquidity and long transaction times in the direct property market. However, the coefficient on the inflation factor (θ_i) is measured by a fixed parameter. Finally, the respective parameters in equation (1), (2) and (3) could be collectively estimated via the Kalman Filter maximum likelihood technique in a state space formulation. Other property papers where this Kalman Filter technique has been used include Matysiak and Brown (1997) and Liow (2001). The unique feature of the state space model is that it allows the updating of coefficients (abnormal returns and the betas) each time a new observation is available; as such, it accounts for possible parameter instability (Harvey, 1993). The MJI is given by $\alpha_{i,t}$, $\alpha_{i,t} > 0$ implies that the security has outperformed the market or it has earned an abnormal return.

With the estimated time-varying MJI of the property companies, first, the (real) abnormal returns for the property firms are evaluated; and second, an assessment of the relationship between the excess returns of the individual property stocks and the direct property is conducted via multiple regression analysis. In line with earlier studies that examined the linkages between direct and indirect property returns such

as Liow (1998), up to four-quarter lagged property stock excess returns were included in equation (4):

$$MJI(PPIA)_t = A_0 + B_0 * MJI_{i,t} + B_1 * MJI_{i,t-1} + B_2 * MJI_{i,t-2} + B_3 * MJI_{i,t-3} + B_4 * MJI_{i,t-4} + (error\ term)_{i,t} \quad (4)$$

where $MJI(PPIA)_t$ is the current period time-varying risk-adjusted return of direct properties and $MJI_{i,t}$, $MJI_{,t-1}$ ... are the abnormal returns of property stock i at periods t, t-1.... In the sense of "cointegration", if significant coefficients (B_s) attached to the current and lagged property stock abnormal returns are detected, then the respective risk-adjusted returns are said to track each other and thus provide indirect evidence on the performance of the underlying physical property market.

Sample

The market value of the Singapore listed property sector in December 1999 was S$26.42 billion, representing about 8.4% of the stock market by market capitalization. Of all the 26 property companies listed on the Singapore Exchange at end December 1999, this study include 17 firms that traded for the entire ten-year period, 1990 to 1999. In addition, a property stock portfolio based on value-weighted returns of the 17 firms is constructed. Table 1 provides a list of the firms, mean return, standard deviation and their 1999 market capitalization. The higher ends are City Developments (S$7.81 billion), DBS Land (S$4.27 billion), Keppel Land (S$1.93 billion) and the lower ends are Jack Chia-MPH (S$132 million), L.C. Developments (S$129.3 million) and Chemical Industries (S$57.4 million).

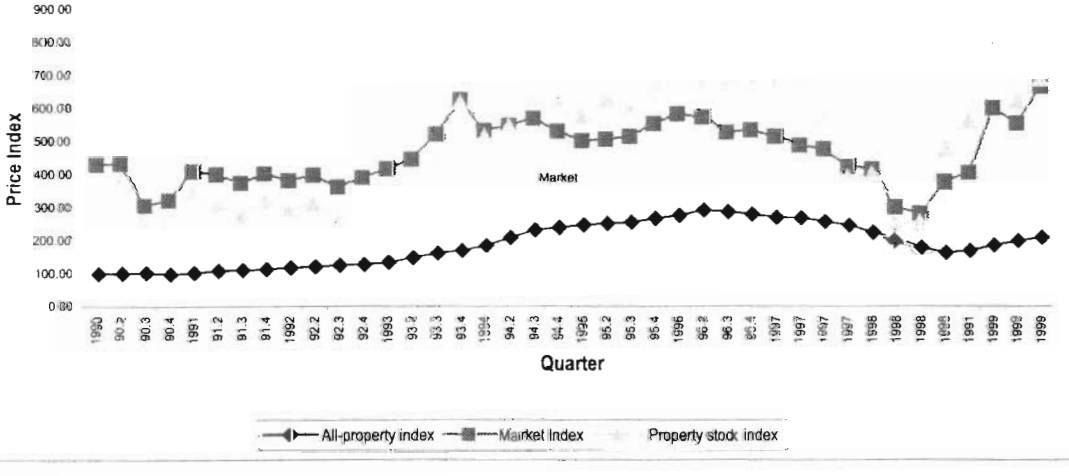
Table 1: Property Companies: Quarterly Returns and Market Value: 1990Q1–1999Q4

Company	Mean quarterly return (%)	Standard deviation (%)	Market value $'m (Dec 99)
Chemical Industries (CHMI)	0.47	14.70	57.38
Jack Chia - MPH (JMPH)	0.19	23.10	132.01
Orchard Parade Holdings (OPHH)	1.10	24.57	382.34
L.C. Developments (LCDV)	-3.51	28.48	129.25
Wing Tai Holdings (WING)	0.53	29.78	1400.89
Bonvest Holdings (BVES)	-0.74	26.02	205.04
Bukit Sembawang Estates (BSEM)	3.74	26.69	230.40
Centrepoint Properties (CEPO)	0.62	21.52	1298.18
City Developments (CDEP)	3.34	22.62	7809.96
DBS Land (DBSL)	0.89	22.46	4269.92
First Capital Corporation (FCCL)	1.28	30.07	952.35
Hong Fok Land Holdings (HFOK)	-1.51	24.13	221.85
Keppel Land (KEPL)	-0.13	29.47	1928.74
MCL Land (MCCR)	-0.72	29.00	568.54
Singapore Land (SING)	-1.19	21.50	1506.98
TLBL Land (TLB)	2.26	18.42	151.5
United Overseas Land (UOLL)	0.03	21.20	921.82
Value-weighted portfolio (VALUE)	1.33	20.91	-
Market portfolio (MARKET)	0.82	13.59	-

Quarterly data were used starting from January 1990 to December 1999. The share returns of each company for the sample period were taken from Datastream. The traded all-Singapore Share Index is commonly regarded as a proxy for market portfolio as it provides a good measure of the overall price movements in the Singapore stock market. The three-month Treasury bill rate, available from the Monetary Authority of Singapore, was the adjusted proxy for quarterly risk-free return. The Consumer Price Index (CPI) compiled by the Department of Statistics was used to measure the rate of inflation.

Finally, a direct all-property index (PPIA) was included to measure the returns of the property market over the same period. This index, available only on a quarterly basis and published by the Urban Redevelopment Authority of Singapore, has been considered as the market index for direct properties in Singapore. Specifically, it is a price relative of the current price per square metre of a type of property compared with that in the base year 1990, and is generated using median transaction prices and fixed Laspeyres formula. Generally, the index does not assume the problems inherent in an appraisal-based index, as it is a transaction-based property index generated from transaction prices lodged with the government. Figure 1 displays the quarterly market index, all-property index and the value-weighted property stock price index in the period 1990-1991.

Figure 1: All-Property Index, Market Index and Property Stock Index: 1990Q1 to 1999Q4



EMPIRICAL RESULTS

Table 1 contains the quarterly risk-return statistics for the property companies and general market, as well as the value-weighted property stock returns. Over the entire period, the weighted average property stock return (1.33%) was higher than the market (0.82%). However, only 6 of the 17 companies (35%) reported higher returns than that of the market. The average volatility as measured by the standard deviation in quarterly returns for the 17 firms (20.9%) was higher than the market (13.6%). The volatility range was from a low of 14.7% to a high of 30.1%. These results are compared to those reported in Liow (1997) that the 21-year weighted property stock return was 0.76% compared to 0.73% for the general market. The volatility in

monthly property stock returns was also lower, ranging between 8% and 16.6%. Hence, there is some preliminary evidence that the risk-return profile of property stocks over the study period could be different from that in the long-term period.

The quarterly time-varying results reported in Table 2 show that the value-weighted property stock portfolio displayed a positive abnormal return (0.54%) that was statistically indistinguishable from zero after controlling for both the market and inflation risks. Individual company results reveal that 11 out of the 17 property companies (65%) displayed negative abnormal returns. Of the remaining six companies that reported positive abnormal returns, only 3 cases (Bukit Sembawang Estates, City Development and DBS Land) significantly outperformed the market at the 5 percent level. Table 2 further suggests that over time, there could be considerable variation in the quarterly figures. The time-varying MJIs show that in eight cases abnormal returns were negative in every quarter, showing no tendency towards positive abnormal performance. Another three companies exhibited positive abnormal returns in each quarter and their average figures were significantly from zero. The remaining six companies registered most of their negative returns between 1996-1998 when the markets were affected badly by the anti-speculation measures on the residential property sector and regional economic crisis.

Greater insight is hence obtained into the quarterly profile of abnormal returns by taking a time-varying parameter approach. Finally, most of the property firms did not provide a hedge against inflation (results not reported). The coefficient for inflation for the value-weighted property stock portfolio was negative, but was highly insignificant. This finding is consistent with that reported in Liow (1997) that property firms in general failed to provide ex-post inflation protection. The 21-year coefficient for the "inflation" factor was positive but highly insignificant.

Table 2: Time Varying (Quarterly) Modified Jensen Abnormal Return Index (MJI) 1990Q1–1999Q4

Company	Average value (%)	Maximum (%)	Minimum (%)	Standard deviation (%)
CHMI	0.12	15.05	-17.28	6.34
JMPH	-0.63*	-0.30	-1.03	0.21
OPHH	0.74	28.88	-31.19	12.49
LCDV	-4.90*	-4.08	-5.82	0.43
WING	-0.52*	0.59	-1.57	0.55
BVES	-2.12*	-1.56	-2.63	0.29
BSEM	2.76*	3.32	2.16	0.36
CEPO	-0.35*	0.19	-0.73	0.22
CDEP	2.21*	3.08	1.24	0.54
DBSL	0.77*	1.22	0.25	0.31
FCCL	-0.03	0.81	-1.24	0.60
HFOK	-1.62*	-1.01	-2.23	0.28
KEPL	-0.96*	-0.52	-1.48	0.28
MCCR	-0.87*	-0.43	-1.52	0.28
SING	-1.26*	-0.77	-2.00	0.37
TLBL	1.04	2.64	-1.56	8.24
UOLL	-0.76*	-0.33	-1.16	0.22
VALUE (Portfolio)	0.54	10.76	-15.48	5.62

*Indicates two-tailed significance at the 5% level

Table 3 contains a summary of multiple regression results from equation (4). The time-varying MJI profile for the direct property index was estimated from (1) and is the dependent variable in (4). The quarterly average value is 1.71% and is statistically significant at the one percent level. There is some evidence of a significant relationship between current-quarter abnormal returns of direct property and the value-weighted property stock portfolio. Similarly, current-quarter abnormal returns in physical property are significantly related to the four-quarter lagged abnormal returns of the property stock portfolio. The individual company results are broadly consistent with about 59% (10 cases) current-quarter abnormal returns and 53% (9 cases) four-quarter lagged abnormal returns respectively linked to abnormal returns in direct property market. On the other hand, the relationships between abnormal returns in property and other lagged property stock abnormal returns were found to be negligible. If abnormal property stock performance is to reflect the dynamics of the underlying physical property portfolio and that property stocks usually respond faster to market changes, then one may expect a relationship to hold between the time series abnormal return representations for property stocks and direct properties. The results have thus provided some evidence to support this contention. However, more research studies are necessary to confirm the lead-lag relationship in abnormal returns between individual property stocks and direct properties.

Table 3: Relationship between Direct Property Abnormal Returns and Property Stock Abnormal Returns : 1990Q1–1999Q4

Company	R^2	B_0	B_1	B_2	B_3	B_4
CHMI	0.377	0.002	-0.001	0.011	-0.002	0.009
JMPH	0.437	-0.275	-0.095	-0.352	0.023	0.296[3]
OPHH	0.254	0.002	0.002	0.003	0.001	0.006[3]
LCDV	0.275	0.282[3]	-0.004	-0.025	0.046	-0.172
WING	0.331	0.266[3]	0.002	-0.056	0.002	0.006
BVES	0.268	0.474[3]	-0.081	-0.0192	-0.178	0.524[2]
BSEM	0.927	0.147[3]	0.127[2]	0.083	0.118	0.133[3]
CEPO	0.723	-0.093	0.128[3]	0.119[2]	0.246[1]	0.169[1]
CDEP	0.541	0.488[2]	0.121	0.063	-0.175	-0.211
DBSL	0.595	0.514[1]	0.005	0.018	-0.045	0.041
FCCL	0.671	0.039	-0.023	0.051	0.039	0.202[2]
HFOK	0.563	0.136	-0.030	-0.246	0.062	0.397[1]
KEPL	0.346	0.371[2]	0.239	-0.072	-0.164	-0.053
MCCR	0.558	0.264[3]	0.047	0.064	0.128	0.336[2]
SING	0.515	0.461[1]	0.134	-0.144	-0.172	0.039
TLBL	0.306	-0.001	0.003	0.001	0.007	0.010[3]
UOLL	0.359	0.510[3]	0.124	-0.115	-0.073	0.085
VALUE	0.625	0.019[1]	0.002	0.002	0.006	0.030[1]

[1]Indicates two-tailed significance at the 1% level
[2]indicates two-tailed significance at the 5% level
[3]Indicates two-tailed significance at the 10% level

PROPERTY INVESTMENT IMPLICATIONS

Property companies are specialized asset portfolios whose performance is tied to the direct property market. However, their shares are traded in the stock market. From the portfolio management perspective, as there is some evidence that physical properties were able to earn abnormal returns and provide a hedge against inflation (Glascock and Davidson, 1995), it is interesting to investigate whether similar conclusions could

be obtained for property stocks. The evaluation and comparison of (real) risk-return investment performance of direct properties relative to individual property stocks and aggregate property stock index continues to attract attention.

In the Singapore context, this performance measurement issue is of particular significance to portfolio managers and investors, as investing in stocks of listed property companies has been considered as substitutes for direct property investments. Given the significance and dynamics of the Singapore property stock sector observed (especially) in the 90's, this study was set out to investigate the abnormal return performance of Singapore property firms in the secondary (stock) market over the last ten years (1990-1999) and to further examine whether such abnormal returns are dependent upon the performance of the underlying property portfolio. The findings generated from this study are compared with those reported in Liow (1997) that considered investment performance of property stocks over a longer-term period (25 years).

As property companies' beta and abnormal returns are likely to vary over time, the time-varying Jensen abnormal return profiles for each property firm is estimated using a two-factor model that considers market and inflation risks. For each firm, the Kalman Filter procedure is used to estimate the abnormal return and coefficient for inflation. Matysiak and Brown (1997) used similar procedures as they considered the time-varying Jensen estimation an improvement over the traditional Jensen Index model (JI) that assumes a single beta over the estimation period. Subject to two key limitations; first, the sample is somewhat small since only property firms with complete return data in the study period were examined; and second, methodological shortcomings such as selection of appropriate market proxy and choice of a suitable asset-pricing model to estimate abnormal returns, the results of this study comprise two main parts:

(1) Over the period of study, most of the property firms displayed negative normal returns. Further analyses reveal there were considerable variations in the quarterly abnormal return performance over time. Overall, the average time-varying Jensen measure for the value-weighted property stock portfolio had risk-adjusted returns equal to the market returns. These results are broadly similar to Liow (1997)'s traditional JI evidence that property stocks failed to earn abnormal returns (25-year average JI = -0.08%), and the majority of property companies analysed displayed a risk-adjusted underperformance profile. Matysiak and Brown (1997) obtained similar findings in their study of 18 UK property companies.

Hence one significant implication arising from these studies is that even though there are opportunities for outperformance in the direct property market, it might appear difficult (if not impossible) for investors to exploit consistently the market inefficiencies indirectly by investing in property company shares. Hence, the traditional notion that investing in property stocks presents a good alternative to direct properties need to be re-examined carefully if investors are merely interested in earning abnormal returns in the property stock market.

(2) The time-series abnormal return representations of direct property and property stock markets were linked. Specifically, there was some contemporaneous and (four-quarter) lead-lag relationship between the abnormal returns in the two markets over

the study period. The abnormal return performance of property stocks leads direct property market performance both in the long-run (Liow, 2001) and in the shorter-term investment horizon as reported in this study. More research studies are required to assess the sensitivity and pattern of lead-lag relationship with respect to the different investment horizons. Finally, this study reinforces the prior evidence that the two markets' returns are cross-correlated in the longer-term (Liow, 1998) and adds to the body of knowledge on international real estate studies that focus on performance measurement and the relationship between the securitised and the unsecuritised property markets.

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