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Excess Returns in the Hong Kong Commercial Real Estate Market

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***Abstract*. This study examines the existence of excess returns of the office, retail and industrial real estate sectors in Hong Kong using time series of both valuations and transaction prices. The analysis covers the period from 1980 to 1995. If valuations are an accurate reflection of transaction prices then excess returns, if they exist, should be detected in both series. Our findings confirm that excess returns can be detected in both valuation and transaction-based series. They are not, however, persistent although there appear to be greater opportunities for earning excess returns in the office sector.**

Introduction

Hong Kong is a densely populated island with more than six million people living in a total area of 1,092 square kilometres. More than 67% of the total area is woodland and scrubland. Developed land comprises less than 16% of the total area. Due to the limited supply of land, the real estate sector plays an important role in the economy of Hong Kong. This can best be illustrated by some average statistics for the period from 1983-92, taken from Walker, Chau and Lai (1995):

- More than 45% of the listed companies are either real estate developers or investors or are heavily involved in real estate development and investment.
- The real estate sector, and the construction industry, contribute to more than 20% of GDP (The construction industry, contribute approximately 7% to GDP.)
- More than 35% of total loans and advances in the banking sector are used for real estate development, investment or home purchase.
- More than one third of total government income is related to real estate. This includes income from land sales, premiums charged for change of land use, property taxes and rates, stamp duties for property transactions, profit tax from developers and property investment by the government.
- More than one third of total government expenditure is real estate related, the majority of which is expenditure on the provision and maintenance of government-subsidised housing

The majority of personal wealth in Hong Kong is in three forms: real estate, shares of listed companies and money. Of these, real estate is the most significant. The total value of all real estate in Hong Kong exceeds the total value of all shares and money. The market value of the total stock of real estate, as at the end of 1995, is estimated to be over US$500 billion. This is more than double the size of the Hong Kong stock market for the same period (Stock Exchange of Hong Kong Limited, 1996).

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Despite the relative size of the real estate sector, there are few formal studies that examine its informational efficiency. Although high returns have been earned historically, there is no guarantee that they can be regarded as excess returns, in an economic sense. In this context, an excess return means a return that is higher than expected given the risk class of the asset. This study considers the informational efficiency of the Hong Kong commercial real estate market by examining both valuation and transaction-based data. If each of these capture the same information set, then evidence of excess returns should, if they exist, be reflected in both series. There should be, therefore, similarity between an analysis of returns using both transactions prices and valuation data.

The study is organised as follows. The second section briefly describes the background and relevant previous research. Section three discusses the data and methodology used in the analysis. The fourth section presents the results and section five offers some concluding comments.

Background and Previous Research

Over the last ten years, the study of market efficiency has produced more research studies than any other area of financial economics. This is understandable since tests of market efficiency are concerned with how well information is impounded into market prices. If inefficiencies can be identified in any market, then it presents potential opportunities for earning excess returns.

Studies of real estate efficiency have also grown substantially over the past ten years. A comprehensive review can be found in Gatzlaff and Tirtiroglu (1995). Allied to this strand of research is the area of valuation smoothing. Any views concerning market efficiency are dependent upon the time-series characteristics of the data used. Tests of market efficiency should be carried out using transactions prices. In the absence of such data, most studies have used valuations. This, however, introduces additional difficulties caused by a combination of temporal aggregation and valuation smoothing. Attempts to de-smooth real estate valuation series have been made with the assumption that the profile of the underlying true market returns are random. If this structure is imposed on the transformed series, it will be evident that it is no longer possible to undertake a valid test for market efficiency. In order to examine the effect of market efficiency in terms of both valuations and prices, it is necessary to use a transformation process that does not make strong assumptions concerning the stochastic properties of the underlying implied transactions prices. This is the approach adopted in this study.

Tests of Real Estate Market Efficiency

One of the major difficulties in testing for weak form efficiency in the real estate market is the availability of reliable time-series data. Due to the heterogeneous nature of real estate and thinly traded markets, transaction-based price indexes are usually not available. Those studies that have been done have generally inferred transaction prices indirectly from limited market data.

The earliest studies on weak form efficiency were undertaken by Gau (1984) and Brown (1985, 1991) by using the conventional correlation test. Both studies relied upon valuation data and showed that there was little serial correlation in periodic returns at both the individual real estate and portfolio levels.

Valuation Smoothing

Tests of market efficiency based upon valuations may be biased due to the fact that valuers estimate current valuations by combining information about known comparable transaction prices with the most recent valuation. If it is assumed that an individual property has a current transaction price, P_t, this can be represented as a combination of its true market value $\hat{P}_t$ plus a random error term, e_t thus:

$$P_t = \hat{P}_t + e_t . \tag{1}$$

Quan and Quigley (1991) demonstrate that if transaction prices follow a random walk, the optimal current estimate of value can be estimated from:

$$V_t = kP_t + (1-k)V_{t-1} , \tag{2}$$

where: V_t = valuation at time t, and:

$$k = \frac{\sigma_u^2}{\sigma_u^2 + \sigma_v^2}, \quad 0 \le k \le 1,$$

σ^2_u=exogenous and specific variability of the property's implied return;
σ^2_v=transactions noise.

All information concerning the property is assumed to be summarised in the variance, σ^2_u, resulting from random market-wide movements and the variance of property-specific factors, together with the transactions noise, σ^2_v, which will be determined by factors such as buyer and seller valuations and their relative bargaining strength.

The factor k in this expression is a function of the relative size of transactions noise and the signal variance of market-wide factors. This simple exponential smoothing approach to updating valuations has been demonstrated to be optimal when true market values are expected to fluctuate around a mean value, but the mean value itself is likely to change over time (Giaccotto and Clapp, 1992). Changes in value derived from this model can be shown to exhibit serial correlation due to the smoothing of valuations. Thus tests of market efficiency based upon smoothed returns cannot reject the hypothesis that the market is efficient.

A number of models have been proposed for removing the serial correlation that exists in an index of capital values. Blundell and Ward (1987), for example, used a first-order autoregressive process to estimate unobserved market values on the assumption that the underlying returns-generation process followed a random walk. Similar procedures have also been followed by Ross and Zisler (1991), Geltner (1989, 1991, 1993) and Fisher, Geltner and Webb (1994). Geltner (1993) and Barkham and Geltner (1994) have also examined the problem of smoothing without making the assumption that the underlying market is efficient. A common feature of these models is that the smoothing parameter is assumed to be constant.

Although the model implicitly assumes that the value of k is constant over time, so that valuers use the same updating rule *under all market environments*, Quan and Quigley (1991) suggest that the optimal updating rule can be made more realistic by employing a

Kalman filter algorithm and recognising that the value of k will change in response to different market conditions. It can be shown that as long as the smoothing parameter is not less than 0.5, the estimation of implied prices is little affected by using time-varying parameters (Brown and Matysiak, 1996).

Methodology and Data

The Hong Kong commercial real estate market is unique in having both valuation and transaction-based indexes available. Given that current valuations are a function of market prices, and assuming that it is possible to extract market prices from the valuation data, then this presents two propositions: (1) Do excess returns exist? (2) If so, do they exist in both series?

Alternative methods are used to test for excess returns in Hong Kong using transaction and valuation data.

Method Involving Rating and Valuation Department (RVD) Transaction Data

The approach adopted in this study is similar to those adopted by Guntermann and Smith (1987), Krashinsky and Milne (1987), Rayburn, Devaney and Evan (1987), and Case and Shiller (1989). Two tests of real estate market efficiency are performed using a real total return series. The real total return series include both capital gains and after-tax net rental income and take into account depreciation, on a straight-line basis, of the building structure. The RVD capital indices, rental income indices and inflation indices are used to construct the real total return series.

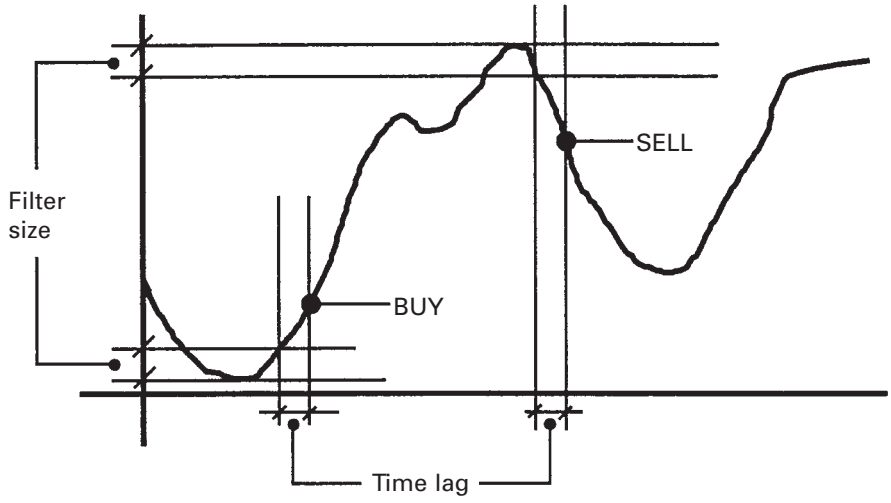
The serial correlation in returns is examined to see if future returns can be predicted from past returns. Significant serial correlation indicates the possibility of predicting future returns and implies market inefficiency. Since the presence of significant serial correlation may not necessarily be inconsistent with the fair game model, mechanical trading strategies are developed to see if consistent excess returns can be exploited.

The trading strategies examined are simple filter rules using different filter sizes. The filter rule gives a buying signal when the price has increased from a previous low by x%, where x is the size of the sell filter. Similarly, a sell decision is triggered when the price has decreased from the previous peak by x%. These are shown in Exhibit 1. Since it takes time for price information to be released and for properties to be traded there will always be a time lag between the realisation of the buy/sell signals and actual transactions.

Excess returns are calculated as the real total return that can be achieved by adopting the filter rule, taking account of transaction costs and the real return that could be achieved by adopting a buy-and-hold strategy. Since short-selling in real estate is not possible, the money received after a sell decision is assumed to be invested in an interest-bearing bank account. The interest is assumed to be the three-month fixed deposit rate offered by the Hong Kong Bank.

In this part of the study, buying and selling signals are derived from the changes in the real total return series (i.e., inclusive of after-tax rental income and net of inflation) and not from the real capital growth series. Only tangible transaction costs such as agent's fee, stamp duty and legal charges are taken into consideration in the calculations. There is no capital gains tax in Hong Kong. If excess returns can be earned consistently using the filter rules, this would signal rejection of the efficient market hypothesis at the weak form level.

Exhibit 1
Illustration of Filter Trading Rules



Method Using Valuation Data

An alternative way of looking at excess returns is to consider them within the framework of trying to achieve positive net present values (NPVs). For a property to generate a positive NPV, it must be bought when it is underpriced and/or sold when it is overpriced. This results in a strategy for buying or selling that is similar to the filter rule identified above. Briefly this can be considered as follows.

If a property can be sold at a figure in excess of its current equilibrium market value, after having made allowance for transaction costs, the market can be regarded as being 'overpriced'. This will result in a sell recommendation and generate a positive NPV. Similarly, if a property can be bought at a figure below its current equilibrium market value, because the market is 'underpriced,' then this will result in a buy recommendation and again generate a positive NPV.

At the individual property level, 'prices' may be 'sticky'. However, professional valuations will also be 'sticky' if they use 'sticky' prices as comparable evidence. Nevertheless there will still be an equilibrium value for each property that will respond to the random arrival of information on a continuous basis. This principle can also be extended to the index level and suggests a two-stage process of decomposing a valuation index into equilibrium market values and underlying implied transaction prices. As both these elements are unobservable, the solution is non-trivial and raises a number of complex issues.

One approach to the estimation of implied transaction prices is to derive a series of equilibrium market values from the valuation series, using an unobserved components model, and to use this information as the basis for estimating the smoothing parameter identified in equation (2). Once this value is known it can then be used to estimate the implied transaction prices. The difference between the transactions price and equilibrium market values will indicate when the market is under and overpriced.

Assume that a valuation smoothed series (X_t) can be expressed in two alternative forms:[1]

$$X_t = kP_t + (1-k)X_{t-1} \qquad \text{where } 0<k<1 \tag{3}$$

$$X_t = MV_t + e_t \qquad e_t \sim NID(0,\sigma^2_e)\ . \tag{4}$$

P_t represents the prices implied in the valuation smoothed series. MV_t is the local level and can be interpreted as the equilibrium, or liquid market values. The term e_t is a random error that picks up the effects of non-trading.

In order to solve equation (4) it is necessary to specify a transition equation that determines the evolution of the underlying, unobservable, equilibrium market values. This can be expressed as follows;

$$\begin{aligned} MV_t &= Mv_{t-1} + \gamma_{t-1} + \varepsilon_t, \qquad \varepsilon_t \sim NID(0,\sigma^2_\varepsilon) \\ \gamma_t &= \gamma_{t-1} + \eta_t\ , \qquad\qquad\quad \eta_t \sim NID(0,\sigma^2_\eta)\ . \end{aligned} \tag{5}$$

In this expression γ_t is the slope and η and ε_t are random error terms. The equilibrium market values MV_t are assumed to evolve as a random walk with the trend in MV_t also evolving stochastically through the behaviour of γ_t. If information arrives randomly, this assumption is not unreasonable. The solution to this set of equations is given in Harvey (1993). The equilibrium market values extracted above can also be used to establish the smoothing parameter k in equation (3), if it is assumed that the equilibrium market values (MV_t) and market prices (P_t) both have the same variance (Brown and Matysiak, 1996). Once a value for k has been established, it can be substituted back into equation (3) to solve for P_t as follows:

$$P_t = \frac{X_t - (1-k)X_{t-1}}{k}\ . \tag{6}$$

Given that MV_t is assumed to represent equilibrium market values, a comparison of the implied prices, P_t, with MV_t will indicate when the market is under and overpriced. Thus if $(P_t - MV_t)>0$, then the market is overpriced. Similarly if $(P_t - MV_t)<0$, then the market is underpriced.

The unobserved components model represents current valuations as the sum of an unobserved equilibrium market value together with a random non-trading adjustment. This is less restrictive than equation (2), but does make the assumption that the information influencing equilibrium market values arrives in a random fashion. If the information set cannot be predicted, then it must be regarded as a random event. Changes in price must also be random (Ross, 1989) although this is not imposed as a formal structure on the changes in price. The evolution of equilibrium market values can be assumed to respond in a similar fashion.

The estimation process proceeds by using a Kalman filter (Harvey, 1993) to derive the unobserved equilibrium market values from the published valuation series.

Data Sources

The valuation indexes used in this study are based upon data collected by Jones Lang Wootton (JLW). The indexes are available from the fourth quarter 1983 and are based upon the valuation of a portfolio of property at the end of each quarter. Both price and rental indices are available for each of the major submarkets namely, residential, office, retail, and industrial. Each valuation included in the index is an estimate of the market view concerning transaction prices. They can be considered to be a weighted average of an unknown transaction price together with information concerning the most recent valuation.

By contrast, the Rating and Valuation Department (RVD) of the Hong Kong Government publishes capital and rental price indexes for subsectors of the real estate market based upon transactions evidence. The price indexes are based upon average transaction prices per square metre of gross floor area, adjusted by the rateable value for differences in factors such as quality, age, location, etc. The rateable value is the RVD's assessment of the annual rental income of the property. The RVD rental index is based on the average rent per floor area of the registered leases. There is one price index and one rental index for each of the four submarkets, namely office, retail, industrial, and residential.[2] The indexes are available on a quarterly basis from the fourth quarter 1979.

The reliability of a transaction-based index depends on the trading volume and the method of controlling for those attributes that influence price. The volume of real estate transactions in relation to size of the total stock of real estate is relatively high in Hong Kong compared with most other cities. Since the early 1980s, the value of real estate transactions is, on average, more than 10% per annum of the total value of the stock of private real estate assets (Chau and Ma, 1996).

The high trading volume is attributable to the dynamic nature of Hong Kong's economy and simple taxation system. There is also no capital gains tax and the tax on rental income is only 15% for individuals and 16.5% for corporations. Transaction costs are also relatively low. Real estate agents are free to charge any market rate although these normally do not exceed 1% of the transaction price for both the buyer and seller.

The small size of Hong Kong and the relatively short economic life of buildings tends to reduce any errors in the price index arising from possible bias caused by adjusting the average transaction prices for differences in those factors that affect price. In addition the mortgage policy adopted by most banks in Hong Kong is to discriminate against older buildings (Chau and Ma, 1996). More favourable terms will normally be given to buildings not more than ten years old. The result of this policy is that most properties transacted in the market are less than ten years old. These factors tend to make the market more homogeneous.

Despite the favourable situation in Hong Kong that allows the RVD to construct transaction-based indexes, they are not without problems. *First*, the indexes are based upon average transaction prices within a quarter. This averaging effect tends to smooth the index, which leads to an overestimation of the serial correlation in price changes (Working, 1960). *Second*, the registered transaction prices may not represent the true market prices. Rent concessions are common during downturns in the property cycle and in some cases, furniture and fixture, machinery, equipment, etc., are provided by the landlord so that rental values can be maintained at a higher level. In addition, developers in Hong Kong often provide favourable financing packages to buyers in order to boost

confidence by keeping transaction prices high. The decline in property prices during the property slump is therefore not fully reflected in the RVD indexes. *Third*, the rateable values used by the RVD to adjust for those factors that influence price may themselves be biased. However, the nature of the resulting bias is difficult to assess.

Results

Rating and Valuation Department (RVD) Transaction-Based Series

Exhibit 2 shows that all sectors exhibit significant serial correlation up to a lag of four quarters. With the exception of the retail sector, the first-order serial correlation is in line with the upper limit suggested by Working (1960) for data which is averaged if the underlying series follows a random walk. The higher-order coefficients remain high and do not die away for several lags. The returns have been adjusted for the effects of inflation. Part of the serial correlation may, however, have been introduced by the Consumer Price Index.

Nevertheless, there is evidence to suggest that, in real terms, there is some relationship between current and past prices, which may be capable of being exploited.

The possibility of earning excess returns is examined by using the filter rule. Exhibits 3 to 5 show the results of filter tests for the retail, industrial and office real estate sectors, net of transaction costs of 2% on sales (i.e., 1% agent's fees and 1% legal and related charges) and 6% on purchases (i.e., 1% agent's fees, 2.75% stamp duties and 2.25% legal charges).

The 10% filter yields the highest excess returns for all sectors for almost all time-lags. Other filters around 10% yield similar results. The 10% filter is optimal or close to optimal since a larger filter (15%) missed some profitable trading opportunities and a smaller filter (5%) generated too many transactions which dissipated a large proportion of the trading profits in the form of costs.

In all cases, the shorter the time-lag, the higher the excess returns. Thus, a timely response to new information is important in terms of investment performance. Responding to short-term signals is difficult to achieve in practice, since it takes the Rating and Valuation Department two quarters to release its index. Thus, a three quarter lag is not an unreasonable assumption, if investors rely on official statistics. The chance

Exhibit 2
Serial Correlation of Real Return Series: 1980–1994

Lag (quarters)	Office	Retail	Industrial
1	.236	.369*	.207
2	.306*	.254*	.454*
3	.262*	.220	.399*
4	.163	.358*	.197
5	.266*	.148	.066
6	.005	.133	.132
7	.181	.162	−.096
8	−.170	.022	−.010

*denotes significance at the 5% level

Exhibit 3
Excess Returns from Real Series—Retail Subsector

	Time Lag in Quarters			
Filters	1	2	3	4
15%	−.23%	−1.29%	−1.92%	−2.57%
10%	+1.35%	+.71%	−.70%	−.97%
5%	+1.22%	+.12%	+.07%	−1.73%

Exhibit 4
Excess Returns from Real Series—Industrial Subsector

	Time Lag in Quarters			
Filters	1	2	3	4
15%	+1.17%	+.60%	−.83%	−.69%
10%	+1.35%	+1.03%	−.12%	−.88%
5%	−.03%	−.44%	−1.23%	−3.74%

Exhibit 5
Excess Returns from Real Series—Office Subsector

	Time Lag in Quarters			
Filters	1	2	3	4
15%	+2.49%	+.33%	−3.38%	−3.70%
10%	+4.19%	+3.22%	+1.51%	−.61%
5%	+2.12%	+2.12%	−1.62%	−.49%

of exploiting excess returns from the serially correlated real return series is slim for most subsectors.

The excess returns for the retail and industrial subsectors are positive only when the time-lag is shorter than or equal to two quarters. Excess returns for the office subsector are larger and remain positive up to a lag of three quarters using a 10% filter. The significant positive excess returns for the office subsector indicate that this sector may be inefficient. If an investor can commit resources to analysing changes in price level based upon transaction records, instead of relying on the official release of price indices, and shorten the time lag to two quarters, a significant return of more than 3% may be earned. The success of this strategy will depend on the ability to minimise search costs.

Exhibits 6 to 8 show the excess returns when the nominal instead of real return series are used. They are, in general, a lot smaller than those of the real return series. The results suggest that, in nominal terms, the retail and industrial sectors of the Hong Kong real

Exhibit 6
Excess Returns from Nominal Series—Retail Subsector

	Time Lag in Quarters			
Filters	1	2	3	4
15%	+1.17%	+.60%	−.83%	−.69%
10%	+1.35%	+1.03%	−.12%	−.88%
5%	−.03%	−.44%	−1.23%	−3.74%

Exhibit 7
Excess Returns from Nominal Series—Industrial Subsector

	Time Lag in Quarters			
Filters	1	2	3	4
15%	−.17%	−.72%	−2.10%	−2.02%
10%	−.17%	−.71%	−2.08%	−2.00%
5%	−.35%	−.49%	−.86%	−.99%

Exhibit 8
Excess Returns from Nominal Series—Office Subsector

	Time Lag in Quarters			
Filters	1	2	3	4
15%	.53%	−1.38%	−1.29%	−2.46%
10%	−2.81%	−3.00%	−5.73%	−6.63%
5%	−5.54%	−6.18%	−11.94%	−11.55%

estate market are weak-form efficient with respect to historical real estate price and rental information. There is, however, some evidence to suggest that inefficiencies exist within the office sector. This confirms the results obtained using the real return series. The use of a filter rule is, however, a mechanical process that is subject to any bias that may exist in the underlying data. Thus a negative or zero excess return, in this context, does not preclude the possibility of identifying profitable trading strategies based upon other methods of processing historical information. The trading rule used in this analysis merely identifies the fact that inefficiencies exist in the Hong Kong office market. The following analysis, based upon valuation data, aims to identify buy-sell strategies that may be possible to exploit these inefficiencies.

JLW Valuation-Based Series

The serial correlation structure of the changes in capital growth for the JLW valuation series is summarised in Exhibit 9. It will be seen that there is some evidence of serial dependency but this dies away after the first lag.

Exhibit 10 shows the serial correlation for the RVD nominal capital growth series over the same time horizon as the JLW series. The first-order serial correlation for each sector for the RVD series is insignificant and is also smaller than those of the JLW series. This is not unexpected as the RVD index is transaction based whereas the JLW index is valuation based.

Using the methodology discussed previously it is possible to decompose the JLW capital value index into an equilibrium market value index and an implied transaction price index. As discussed, the difference between these two indexes should identify when the market is both under and overpriced. The a priori assumption is that over long periods, the difference between valuations and prices should be zero. This does not preclude the possibility that excess returns may be achieved for short periods. Exhibit 11 summarises the excess returns for each sector over the period 1984 to 1995.

The mean excess return for each sector is statistically indistinguishable from zero. The office sector has a mean excess return that exceeds both the retail and industrial sectors. This implies that there was greater opportunity for earning excess returns in the office sector.

Exhibits 12 to 14 show the profile of the excess returns over the period from 1984 to 1995, Transactions costs of 2% on sales and 6% on purchases are also shown. It will be

Exhibit 9
Serial Correlation of JLW Capital Growth Series: 1984–1995

Lag (quarters)	Office	Retail	Industrial
1	.368*	.489*	.202
2	.085	−.053	−.099
3	−.009	−.172	.185
4	−.118	−.237	.007
5	−.171	−.263	−.221
6	−.128	−.117	.016
7	.060	−.014	.168
8	−.139	−.056	−.202

*significant at the 5% level

Exhibit 10
Serial Correlation of RVD Capital Growth Series: 1984–1995

Lag (quarters)	Office	Retail	Industrial
1	.176	.213	.138
2	.174	−.092	.276*
3	.187	−.004	.338*
4	−.079	.112	.024
5	−.048	−.040	−.015
6	−.072	−.027	−.116
7	.040	.041	−.090
8	−.282*	−.013	−.354*

*significant at the 5% level

Exhibit 11
Excess Returns Based upon JLW Capital Value Index 1984–1995

	Office	Retail	Industrial
Mean Excess Return	1.733	.985	.668
Std Dev.	15.088	9.947	7.968
Max.	34.700	28.310	14.830
Min.	−44.520	−21.680	−27.560

Exhibit 12
Excess Returns in the Hong Kong Office Sector: 1984–1995

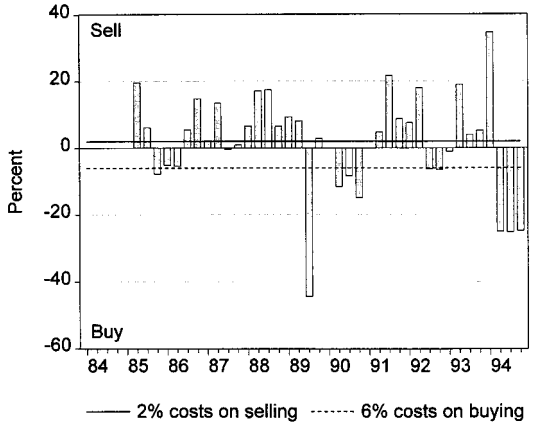


Exhibit 13
Excess Returns in the Hong Kong Retail Sector: 1984–1995

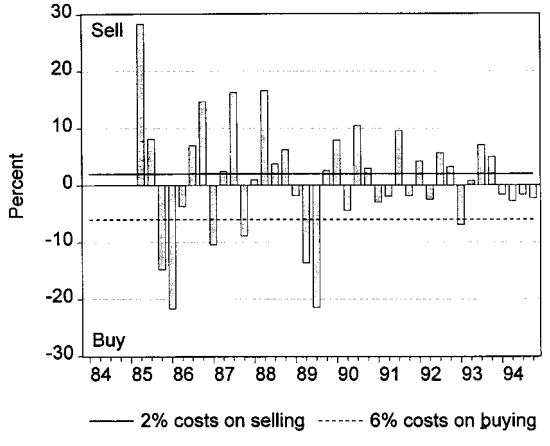


Exhibit 14
Excess Returns in the Hong Kong Industrial Sector: 1984–1995

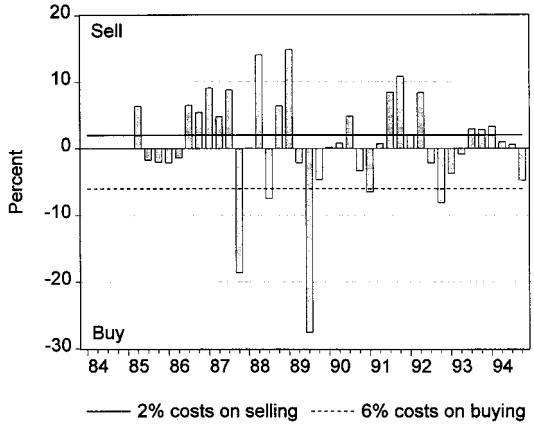


Exhibit 15
Cross-Correlation of Excess Returns 1984–1995

	Office	Retail	Industrial
Office	1.000		
Retail	.437	1.000	
Industrial	.546	.506	1.000

seen that there is considerable volatility in the profile with the office sector tending to dominate in most periods. The opportunities for earning excess returns are, however, relatively short. This would imply that it is probably difficult to achieve returns that exceed the market average without acquiring specific knowledge concerning the potential performance of individual properties.

It will also be seen that there is a pronounced negative excess return for all sectors in the second quarter 1989. This coincides with the effect of the Tiananmen Square incident in Beijing on the 4th June. There is also a downward trend in excess returns from the beginning of 1988 to mid-1990 that mirrors the general slump in real estate prices observed worldwide (Richard Ellis, 1996).

Exhibits 12 to 14 also show that there is some correlation between the excess performance of each sector. If there is persistence in mispricing, a strong positive correlation between the excess returns in each sector would justify the creation of a portfolio of properties. The correlation between sectors is summarised in Exhibit 15.

Conclusions

The analysis of both transaction and valuation data confirm that it is possible to earn excess returns in the Hong Kong commercial real estate market. However, if allowance is

made for transaction costs, this does not persist for long periods. The office sector offers the greatest opportunity for earning excess returns, and this is confirmed in both tests. The difference between the retail and industrial sectors is less clear. Given that the minimum holding period for most real estate investments is likely to be in the region of five years, the opportunity to capitalise on any mispricing, after costs, is small. Investors would need to be well informed concerning market opportunities and be able to identify persistent periods of disequilibrium. Valuation and transaction data do, however, appear to respond to the same information set.

The opportunity to exploit any mispricing is based upon the assumption that buying and selling activities will not affect market prices and that the indices are representative of the investor's portfolio. This implies that excess returns can only be exploited if the investor can construct a portfolio that replicates the returns implied by the respective indices. The construction of such a portfolio would require considerable resources. Another issue is that the size of the portfolio is likely to be extremely large which would create barriers of entry for some investors. One way of overcoming this is to securitize the portfolio, but this implies added costs. In addition, the size of the portfolio may be large in relation to the total transaction volume. This is especially true in less active markets such as the office sector. Buying and selling these properties could affect market prices and as a result, investors may not be able to buy or sell according to the trading rules at the levels indicated by the price index. Taking these issues into consideration, the higher excess return in the office sector may not be inconsistent with the efficient markets hypothesis.

Nevertheless, the office sector does appear to offer the greatest potential for earning excess returns. This also implies that real estate practitioners may be able to organise their research function in innovative ways that would enable them to identify and capitalise on any mispricing.

Notes

[1]It is assumed that at the index level the effects of temporal aggregation are small so that the series only reflects valuation smoothing. The serial correlation structure shown in Exhibit 6 confirms that temporal aggregation is not a significant problem with Hong Kong valuation indices. In situations where this is a problem the effects of temporal aggregation may first need to be removed.

[2]The residential market is further divided into five submarkets according to the size of the residential unit.

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