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# Linkages between direct and indirect property performance in Hong Kong

HK property  
performance  
linkages

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## Introduction

One of the most challenging problems facing institutional property investors is the relationship or linkage between indirect and direct property investment (Myer and Webb, 1993). This has been particularly evident in recent years with the downturn in many property markets and the resulting problems with illiquidity. This saw many institutional investors reduce their allocations to direct property and increase their allocations in indirect property (via property companies, property trusts or real estate investment trusts (REITs)), with liquidity and yield becoming key property investment considerations.

Part of this challenge relates to the quality of the direct property performance information. Owing to the infrequent trading of commercial properties in most property markets and the absence of a centralized exchange for property transactions, sales-based commercial property performance indices are not readily available. While an alternative data source for property performance is available from the transaction-based indirect property series, such as property companies, property trusts or REITs, strong concerns have been expressed against their use as a proxy for direct property performance, as indirect property returns appear to be more highly correlated with stock market returns than direct property returns. This reinforces the view that property company, REIT and property trust performance are more reflective of stock market performance than the underlying physical property performance.

This area of the linkages between indirect and direct property has attracted considerable research interest in recent years. Much of this research has shown that indirect and direct property performance are more closely related than previously thought. Giliberto (1990) used equity REITs to identify a common factor associated with both direct and indirect property in the USA, with lagged values of the equity REITs explaining direct property performance. This common factor was labelled as "pure" property in the sense of it representing property market fundamentals that are not shared with financial asset markets.

Gyourko and Keim (1992; 1993) showed lagged REIT returns can predict direct property returns after controlling for persistence in the appraisal-based Russell-NCREIF series in the USA. Myer and Webb (1993; 1994) examined

EREITs and commercial property in the USA and found that EREIT returns Granger-caused commercial property returns. This was more evident at the property index level, with variable results achieved for individual REITs. When retail REITs were considered, no positive evidence of a relationship was found.

After correcting for appraisal-smoothing in the direct property series and accounting for leveraging in the property company series, Barkham and Geltner (1995a; 1995b) identified lags of up to one year in the UK and two years in the USA, with the property companies and REITs leading the respective property markets.

Similar studies have also been conducted in other countries, with a range of linkages observed. These include:

- Singapore: one quarter lead by property stocks over property market (Ong, 1994; 1995).
- Hong Kong: one quarter lead by stock market over residential property prices (Cheung *et al.*, 1995; Fu, 1994).
- Australia: one to two year lead by property trusts over property market (Jones Lang Wootton, 1995a; Newell and MacFarlane, 1995a).

Given the significance and dynamics of the Hong Kong commercial property market, the purpose of this paper is to examine the relationship and linkages between property company performance and commercial property performance in Hong Kong. Using Hong Kong property company and direct property returns over 1984-94, a range of key property investment issues will be assessed, including lead/lag relationships, impounding and informational and structural efficiency of the Hong Kong commercial property market. The investment implications will also be highlighted.

### **Significance of property in the Hong Kong economy**

Hong Kong is a major economic force in the Asia-Pacific region. Hong Kong's GDP has grown at an average real rate of over 6 per cent per annum over the last ten years, with the GDP per capita now exceeding that of Australia, New Zealand and the UK (Newell *et al.*, 1996).

This strong economic performance has been largely attributable to the economic integration of Hong Kong and China. This has resulted in a significant relocation of Hong Kong industry to areas in southern China, with Hong Kong being transformed from a manufacturing-based to a services-based economy. Over 1981-93, this saw the service sector increase from 33 per cent to 55 per cent of the total workforce, while the manufacturing sector decreased from 47 per cent to 24 per cent (Colliers Jardine, 1993).

Hong Kong is now one of the four major financial markets, after London, New York and Tokyo. The Hong Kong stock exchange is the seventh largest stock exchange in terms of market capitalization, at US\$280 billion as of July 1994 (Walker *et al.*, 1995). Multinational organizations with headquarters located in Hong Kong have grown from 174 in 1980 to over 600, with over 75 per

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cent of the world's 100 largest banks using Hong Kong as a regional and international centre for financial intermediation (Jones Lang Wootton, 1993). This economic prosperity now sees Hong Kong ranked as the fourth most competitive economy in the world (Walker, 1995).

This economic transformation has caused a significant shift in the composition for the overall demand for land use in Hong Kong, and has had a major impact on the Hong Kong property market in recent years. This is clearly highlighted in the significant contribution of property to Hong Kong's economy.

Property and construction currently contribute 23.5 per cent to Hong Kong's gross domestic product (GDP), with this contribution having been over 20 per cent since 1982 (Walker *et al.*, 1995). Property and construction company stocks contribute approximately 25 per cent to Hong Kong's total stock market capitalization, with this being significantly greater than that seen in other South-East Asian and western countries. For example, contributions to GDP include Thailand (19 per cent), Indonesia (13 per cent), Malaysia (13 per cent), Singapore (11 per cent), Philippines (8 per cent), Japan (3 per cent), the UK (< 10 per cent) and the USA (< 5 per cent) (Walker *et al.*, 1995). After partially including consolidated enterprises which are involved in property development and investment, the contribution of property and construction company stocks increases to approximately 45 per cent of total market capitalization (Walker *et al.*, 1995).

The major significance of property companies to the Hong Kong stock market is reflected in six of the top ten companies listed, and ten of the top 20 companies listed, being property or strongly property-related companies (Walker *et al.*, 1995). In market capitalization order, these property companies include Sun Hung Kai Properties, Hutchison Whampoa, Cheung Kong, Swire Pacific, Henderson Land, Wharf, Hong Kong Land and New World. Many of these property companies also have significant property and infrastructure investments in China.

Given the above significant contributions, as well as over 60 per cent (on average) of capital investment expenditure having been in property since 1983, it is widely accepted that Hong Kong has the most active property and construction sector in the world (Walker *et al.*, 1995).

### **Data sources**

#### *Direct property*

The Hong Kong direct property return series used in this study are the JLW capital value indices (Jones Lang Wootton, 1995b), reported quarterly over 1984-94. The property types analysed were office, retail, industrial and residential property. The JLW property indices are time-weighted, chain-linked indices and are widely acknowledged as the property performance benchmarks for Hong Kong commercial property. These property indices incorporate both valuation-based and transaction-based property information. Unlike most other countries, JLW report a Hong Kong residential property performance series,

reflecting the exclusive nature of the top end of the residential property market in Hong Kong.

*Indirect property*

The ten Hong Kong property companies chosen for this study reflect the range of major blue-chip property developers and property investors in Hong Kong. These property companies are "pure play" property companies and account for approximately 70 per cent of the total stock market capitalization of all Hong Kong property companies. These property companies were:

- *Property developers:* Hang Lung Development, New World Development, Sino Land, Cheung Kong Holdings, Sun Hung Kai Properties, Henderson Land.
- *Property investors:* Great Eagle Holdings, The Wharf Holdings, Hysan Development, Hong Kong Land.

In Hong Kong, property developers are characterized by property acquisition and trading, mainly for development profit, while property investors are characterized by property acquisition and management to achieve long-term growth in capital values and rents.

This property company share price data were adjusted for stock splits, bonus shares, rights issues at a major discount to market price and substantial one-off distributions of capital reserves to arrive at a comparable price series. No adjustments for accounting treatments or leverage were included in these analyses.

Table I gives summary details of these ten property companies including property portfolio composition, market capitalization, net asset value (NAV) and discount at December 1994 (Morgan Grenfell, 1995). All property companies were trading at a discount to NAV, having done so over recent years. This is largely attributable to concerns over the June 1997 return of Hong Kong to China and market concerns over lack of confidence in directors' management style and decision making.

*Other performance indicators*

For comparative performance analysis, the Hang Seng index was used as the Hong Kong stock market performance indicator and the Hang Seng Property sub-index used as the overall Hong Kong property company performance indicator.

Hong Kong bonds were not included in this comparative investment analysis, as the Hong Kong bond market is very immature and thin. This results from the Hong Kong/US dollar exchange rate mechanism and the substantive Hong Kong government budget surpluses over this 11-year period.

**Initial analysis**

Table II presents the average annual return, risk and property-to-shares volatility ratio for each of the Hong Kong property market sectors and property

Property company	Property portfolio composition							Other <sup>a</sup> (%)	Market capitalization (HK\$ <sup>b</sup> bn)	NAV per share (HK\$ <sup>b</sup> bn)	Discount (%)	Number of shares (bn)
	Office (%)	Retail (%)	Industrial (%)	Residential (%)	Hotel (%)							
Property developers												
Hang Lung	20	37	0	0	4	39	14.5	22.08	47	1.23		
New World	23	12	9	19	15	22	35.4	38.50	42	1.60		
Sino Land	27	18	14	38	0	3	16.8	12.48	43	2.35		
Cheung Kong	10	7	9	30	0	44	73.4	47.90	30	2.20		
Sun Hung Kai	21	28	12	37	0	2	116.2	64.23	22	2.32		
Henderson Land	19	21	6	47	0	7	68.8	49.10	12	1.60		
Property investors												
Great Eagle	76	17	0	5	0	2	8.2	8.93	59	2.24		
The Wharf	63	30	4	3	0	0	59.3	43.03	36	2.17		
Hysan	50	14	0	32	0	4	18.0	30.89	43	1.01		
Hong Kong Land	88	12	0	0	0	0	46.0	31.98	45	2.62		

**Notes:**

<sup>a</sup> Other property includes China infrastructure, car parks, China property development, container terminal

<sup>b</sup> HK\$1 = US\$0.13

**Table I.**  
Hong Kong property  
company  
characteristics:  
December 1994

Property component	Average annual return (%)	Risk (%)	Property: shares volatility ratio (%)
<i>Property market</i>			
Office	21.6	19.64	54
Retail	17.3	15.52	43
Industrial	16.8	12.22	34
Residential	21.4	15.71	43
<i>Property companies</i>			
<i>Property developers</i>			
Hang Lung	25.0	69.81	192
New World	21.0	65.60	181
Sino Land	31.7	77.41	213
Cheung Kong	30.3	50.38	139
Sun Hung Kai	29.0	54.58	150
Henderson Land	40.0	67.10	185
<i>Property investors</i>			
Great Eagle	25.5	64.57	178
The Wharf	22.0	42.93	118
Hysan	19.7	43.58	120
Hong Kong Land	18.0	42.34	117
<i>Stock market</i>			
Hang Seng	21.5	36.33	n/a
Hang Seng Property	27.1	44.39	122

**Table II.**  
Analysis of Hong Kong  
property company and  
property market  
performance: 1984-94

companies over 1984-94. Each of the property companies exhibited high volatility, well in excess of the Hang Seng index and often well in excess of the Hang Seng Property sub-index. The property company sector risk (44.39 per cent) was higher than that of the overall stock market (36.33 per cent). The risk associated with the property developer companies was on average higher than that for the property investor companies.

The property market sector risks were much lower, with the property-to-shares volatility ratios in the range of 34-54 per cent. While being below the 60-65 per cent recommended benchmark level (Giliberto, 1990; Hartzell and Webb, 1988), they are well above the volatility ratios typically seen in other major international property series (e.g. USA 25 per cent), Canada (38 per cent) and UK (19 per cent), Newell and MacFarlane, 1995b). Similarly, Table III shows the lack of significance in the serial correlation structure in these direct property series after a lag of one quarter. Again, this is in marked contrast to the significant serial correlation structure seen in the US, UK and Canadian property series (see Table IV), with this persistent serial correlation structure present in these international property series for up to two years.

Serial correlations	Office	Retail	Industrial	Residential	Shares	Property shares
$\rho_{1Q}$	0.35 <sup>a</sup>	0.50 <sup>a</sup>	0.21	0.32 <sup>a</sup>	-0.27	-0.26
$\rho_{2Q}$	0.07	-0.06	-0.10	-0.03	-0.12	-0.16
$\rho_{3Q}$	-0.01	-0.17	0.21	-0.08	0.26	0.23
$\rho_{4Q}$	-0.15	-0.25	0.01	-0.25	-0.33 <sup>a</sup>	-0.36 <sup>a</sup>
$\rho_{5Q}$	-0.23	-0.31	-0.23	-0.25	-0.08	-0.11
$\rho_{6Q}$	-0.17	-0.14	0.02	-0.04	0.30	0.33
$\rho_{7Q}$	0.11	-0.03	0.15	0.15	-0.20	-0.17
$\rho_{8Q}$	-0.17	-0.07	-0.21	0.08	0.08	0.05

**Note:**

<sup>a</sup> Exceeds two standard errors

**Table III.**  
Extent of appraisal-smoothing in JLW Hong Kong property series: 1984-94

Serial correlations	USA: 1980-94		Canada: 1985-94		UK: 1978-94	
	Property	Shares	Property	Shares	Property	Shares
$\rho_{1Q}$	0.64 <sup>a</sup>	0.04	0.58 <sup>a</sup>	-0.05	0.77 <sup>a</sup>	-0.12
$\rho_{2Q}$	0.70 <sup>a</sup>	-0.13	0.44 <sup>a</sup>	-0.07	0.61 <sup>a</sup>	-0.19
$\rho_{3Q}$	0.61 <sup>a</sup>	-0.14	0.49 <sup>a</sup>	-0.16	0.45 <sup>a</sup>	-0.04
$\rho_{4Q}$	0.73 <sup>a</sup>	-0.15	0.77 <sup>a</sup>	-0.10	0.32 <sup>a</sup>	-0.14
$\rho_{5Q}$	0.47 <sup>a</sup>	-0.03	0.46 <sup>a</sup>	0.09	0.20	0.12
$\rho_{6Q}$	0.46 <sup>a</sup>	-0.13	0.32 <sup>a</sup>	-0.15	0.05	0.01
$\rho_{7Q}$	0.42 <sup>a</sup>	-0.20	0.28	-0.05	-0.00	-0.15
$\rho_{8Q}$	0.49 <sup>a</sup>	0.09	0.46 <sup>a</sup>	0.18	-0.12	0.19

**Note:**

<sup>a</sup> Exceeds two standard errors

**Table IV.**  
Extent of appraisal-smoothing in selected international property series

Based on the above evidence, the extent of appraisal-smoothing is not significant in these JLW Hong Kong property series. The ready availability of market evidence from sales, instead of a strong dependence on valuations as a market proxy, is an important factor in this lack of appraisal-smoothing. The extensive use of strata title for commercial property and the resulting frequent transactions in a trading-oriented market are major catalysts to this availability and use of sales evidence in reporting Hong Kong commercial property performance.

In addition, a number of key structural property market features are clearly evident in Hong Kong that facilitate the availability of market evidence instead of a strong reliance on valuations. These structural property market features (Newell *et al.*, 1996) include:



- normal office lease terms are for a maximum of three years, with an efficient rental market;
- short-term holding periods, with market dominated by property traders (not long-term investors);
- significant degree of market liquidity, resulting from high level of strata titling in many major CBD buildings;
- small area and homogeneous property market with large number of transactions; typically the annual transaction volume is approximately 10 per cent of the total asset value;
- no restrictions on leasehold purchases by foreign investors;
- stamp duty at 0.50 to 2.75 per cent of sale price and agent's fees of approximately 1 per cent result in lower transaction costs than seen in most countries (e.g. Australia (6 per cent), Canada (7 per cent));
- 2 per cent tax deduction for depreciation in commercial property;
- no capital gains tax;
- maximum tax rate of 15 per cent (personal) and 16.5 per cent (corporations);
- ready availability of commercial property information, with transaction records (both sales and rentals) available from the Hong Kong Government Land Registry.

Table V presents the inter-asset correlation matrix for Hong Kong property company and property market returns over 1984-94. Low correlations were evident between the stock market and the property markets, particularly for office ( $r = 0.01$ ) and retail ( $r = 0.10$ ). Each of the property companies was highly correlated with the stock market, with correlations ranging from 0.85 to 0.95. A correlation of 0.87 was evident between the property company sub-sector and the stock market. In contrast, there were low correlations between each of the property companies and the Hong Kong property sectors, particularly for office ( $r = -0.03$  to 0.19) and retail ( $r = 0.04$  to 0.24). Each of the direct property markets were highly correlated, with correlations ranging from 0.43 to 0.64.

At first impression this inter-asset correlation structure over the period of 1984-94 would seem to reinforce the traditional view that property company performance is more closely related to stock market performance than property market performance in Hong Kong. However, these correlations assessing the contemporaneous relationship between property companies and the property market in Hong Kong fail to give the complete picture concerning the linkages and dynamic behaviour between these direct and indirect property markets. This needs to be more fully assessed in terms of the leads and lags between these two markets.

	HLD	NW	SL	CK	SHK	HL	GE	TW	HD	HKL	O	R	I	RES	HS	HSP
HLD	1.00															
NW	0.90	1.00														
SL	0.86	0.85	1.00													
CK	0.83	0.85	0.83	1.00												
SHK	0.86	0.92	0.87	0.87	1.00											
HL	0.78	0.87	0.87	0.88	0.90	1.00										
GE	0.70	0.78	0.89	0.78	0.85	0.84	1.00									
TW	0.83	0.90	0.85	0.85	0.85	0.90	0.79	1.00								
HD	0.71	0.78	0.86	0.82	0.79	0.86	0.81	0.92	1.00							
HKL	0.87	0.87	0.88	0.77	0.85	0.81	0.76	0.87	0.81	1.00						
O	0.07	0.04	0.12	0.04	-0.02	-0.03	0.09	0.09	0.19	0.14	1.00					
R	0.20	0.12	0.24	0.09	0.08	0.04	0.16	0.18	0.22	0.20	0.57	1.00				
I	0.21	0.21	0.34	0.18	0.20	0.15	0.20	0.30	0.38	0.24	0.57	0.55	1.00			
RES	0.32	0.31	0.38	0.29	0.30	0.28	0.26	0.37	0.37	0.41	0.64	0.55	0.43	1.00		
HS	0.86	0.92	0.90	0.91	0.92	0.91	0.85	0.95	0.89	0.88	0.01	0.10	0.27	0.31	1.00	
HSP	0.66	0.78	0.78	0.84	0.86	0.90	0.84	0.85	0.87	0.74	-0.03	0.06	0.14	0.24	0.87	1.00

**Notes:**

HLD (Hang Lung Dev.)  
NW (New World)  
SL (Sino Land)  
CK (Cheung Kong)  
SHK (Sun Hung Kai)  
HL (Henderson Land)  
GE (Great Eagle)  
TW (The Wharf)  
HD (Hysan Dev.)  
HKL (Hong Kong Land)  
O (ILW office)  
R (ILW retail)  
I (ILW industrial)  
RES (ILW residential)  
HS (Hang Seng)  
HSP (Hang Seng Property)

**Table V.**  
Hong Kong property  
company and property  
market correlation  
matrix: 1984-94

### Identifying linkages

By examining the speed of the process by which asset prices are formed and impound available relevant information about asset values, leads and lags between direct and indirect markets can be identified and insights derived into market and pricing issues. The main reason for these leads and lags relates to the use of valuation-based property market information and transaction-based property company information.

Tables VI to IX examine the lead/lag relationship between the various property companies and office, retail, industrial and residential property respectively. Strong evidence of changes in property companies prices leading changes in office property and residential property by one quarter is shown.

Property companies	$r_{-2Q}$	$r_{-1Q}$	Correlations <sup>a</sup>				
			$r_{0Q}$	$r_{1Q}$	$r_{2Q}$	$r_{3Q}$	$r_{4Q}$
<i>Property developers</i>							
Hang Lung	-0.11	-0.13	0.07	(0.40)	0.03	-0.16	-0.03
New World	0.07	-0.06	0.04	(0.61)	0.11	-0.16	-0.05
Sino Land	0.02	-0.03	0.12	(0.43)	-0.04	-0.08	-0.01
Cheung Kong	-0.09	-0.14	0.04	(0.41)	0.03	-0.29	-0.12
Sun Hung Kai	0.04	-0.11	-0.02	(0.47)	-0.01	-0.14	-0.07
Henderson Land	0.06	-0.12	-0.03	(0.51)	-0.00	-0.20	-0.12
<i>Property investors</i>							
Great Eagle	0.06	0.04	0.09	(0.46)	-0.04	-0.09	-0.05
The Wharf	0.01	-0.01	0.09	(0.56)	0.02	-0.17	-0.03
Hysan	0.03	-0.01	0.18	(0.52)	0.08	-0.12	0.01
Hong Kong Land	-0.06	0.06	0.14	(0.58)	0.06	-0.02	-0.12
<i>Stock market</i>							
Hang Seng	-0.04	-0.08	0.01	(0.48)	0.02	-0.12	-0.05
Hang Seng Property	0.01	-0.09	-0.03	(0.53)	0.02	-0.17	-0.10

**Table VI.**  
Lead/lag  
correlations between  
Hong Kong office  
property market and  
property companies:  
1984-94

**Note:**

<sup>a</sup> Largest correlation for specific property companies given in parentheses

While not being as strong, similar evidence is found for most property companies concerning retail and industrial property. For those property companies where this was not evident, a contemporaneous relationship between the property company and the property market changes was observed, reflecting the information being impounded at the same time in both series. The sensitivity of this relationship is also influenced by the quarterly frequency of reporting market returns.

In each case, the largest correlations were generally evident for those property companies which had significant levels of that property type in their portfolio (see Table I); namely:

Property companies	Correlations <sup>a</sup>						
	$r_{-2Q}$	$r_{-1Q}$	$r_{0Q}$	$r_{1Q}$	$r_{2Q}$	$r_{3Q}$	$r_{4Q}$
<i>Property developers</i>							
Hang Lung	-0.28	-0.21	0.20	(0.22)	0.12	-0.04	-0.07
New World	-0.08	-0.15	0.12	(0.25)	0.17	0.00	-0.06
Sino Land	-0.19	-0.17	(0.24)	0.16	0.06	0.06	0.03
Cheung Kong	-0.16	-0.22	0.09	(0.21)	0.02	-0.18	-0.11
Sun Hung Kai	-0.18	-0.20	0.08	(0.21)	0.07	-0.14	0.01
Henderson Land	-0.15	-0.23	0.04	(0.09)	0.05	-0.03	-0.04
<i>Property investors</i>							
Great Eagle	-0.10	-0.22	0.16	(0.22)	0.06	0.01	0.07
The Wharf	-0.10	-0.07	(0.18)	0.17	0.08	-0.04	-0.15
Hysan	-0.04	-0.05	(0.22)	0.14	0.04	-0.04	-0.14
Hong Kong Land	-0.11	0.02	0.20	(0.21)	0.19	-0.04	-0.19
<i>Stock market</i>							
Hang Seng	-0.15	-0.22	0.10	(0.19)	0.05	-0.04	-0.08
Hang Seng Property	-0.15	-0.16	0.06	(0.20)	0.09	-0.09	-0.08

**Note:**

<sup>a</sup> Largest correlation for specific property companies given in parentheses

**Table VII.**  
Lead/lag correlations  
between Hong Kong  
retail property market  
and property companies:  
1984-94

Property companies	Correlations <sup>a</sup>						
	$r_{-2Q}$	$r_{-1Q}$	$r_{0Q}$	$r_{1Q}$	$r_{2Q}$	$r_{3Q}$	$r_{4Q}$
<i>Property developers</i>							
Hang Lung	-0.08	-0.31	(0.21)	0.13	-0.16	0.21	-0.10
New World	0.08	-0.30	0.21	(0.31)	-0.06	0.13	0.03
Sino Land	-0.02	-0.15	(0.34)	0.16	-0.11	0.28	-0.17
Cheung Kong	-0.14	-0.32	0.18	(0.24)	-0.24	0.15	-0.03
Sun Hung Kai	0.02	-0.32	0.20	(0.22)	-0.11	0.11	0.04
Henderson Land	-0.02	-0.32	0.15	(0.23)	-0.10	0.20	-0.08
<i>Property investors</i>							
Great Eagle	0.07	-0.10	(0.30)	0.24	-0.16	0.26	-0.10
The Wharf	-0.07	-0.26	(0.30)	0.20	-0.14	0.21	-0.16
Hysan	-0.03	-0.22	(0.38)	0.21	-0.12	0.30	-0.18
Hong Kong Land	0.04	-0.19	(0.24)	0.19	0.04	0.09	-0.24
<i>Stock market</i>							
Hang Seng	-0.06	-0.34	(0.27)	0.18	-0.19	0.22	-0.10
Hang Seng Property	-0.02	-0.30	0.14	(0.23)	-0.13	0.15	-0.07

**Note:**

<sup>a</sup> Largest correlation for specific property companies given in parentheses

**Table VIII.**  
Lead/lag correlations  
between Hong Kong  
industrial property  
market and property  
companies:  
1984-94

**Table IX.**  
Lead/lag  
correlations between  
Hong Kong residential  
property market and  
property companies:  
1984-94

Property companies	Correlations <sup>a</sup>						
	$r_{-2Q}$	$r_{-1Q}$	$r_{0Q}$	$r_{1Q}$	$r_{2Q}$	$r_{3Q}$	$r_{4Q}$
<i>Property developers</i>							
Hang Lung	-0.01	-0.28	0.32	(0.40)	-0.11	-0.06	-0.07
New World	0.15	-0.32	0.31	(0.52)	-0.11	-0.14	-0.10
Sino Land	0.02	-0.21	(0.38)	0.31	-0.17	-0.06	-0.12
Cheung Kong	-0.07	-0.26	0.29	(0.52)	-0.10	-0.19	-0.07
Sun Hung Kai	0.05	-0.33	0.30	(0.42)	-0.07	-0.08	-0.06
Henderson Land	0.08	-0.34	0.28	(0.46)	-0.11	-0.03	-0.10
<i>Property investors</i>							
Great Eagle	0.00	-0.29	(0.26)	(0.26)	-0.19	-0.10	-0.14
The Wharf	0.15	-0.17	0.37	(0.52)	-0.15	-0.06	-0.12
Hysan	0.07	-0.11	0.37	(0.45)	-0.16	-0.07	-0.10
Hong Kong Land	0.08	-0.17	0.41	(0.42)	-0.04	-0.08	-0.25
<i>Stock market</i>							
Hang Seng	0.05	-0.28	0.31	(0.49)	-0.10	-0.05	-0.07
Hang Seng Property	0.05	-0.30	0.24	(0.49)	-0.11	-0.10	-0.13

**Note:**

<sup>a</sup> Largest correlation for specific property companies given in parentheses

- *Office:* New World, Hong Kong Land, The Wharf, Hysan, Henderson Land.
- *Retail:* New World, Hang Lung, Great Eagle, Sun Hung Kai.
- *Industrial:* Sino Land, New World.
- *Residential:* Cheung Kong, New World, Hysan, Henderson Land.

This overall trend of Hong Kong property company price changes leading changes in commercial property by one quarter is in marked contrast to the lags of up to two years seen for the UK, Australian and US property markets. (Barkham and Geltner, 1995a; 1995b; Jones Lang Wootton, 1995a; Newell and MacFarlane, 1995a). This lead period of one quarter is consistent with other studies for Singapore property (Ong, 1994; 1995) and Hong Kong residential property (Cheung *et al.*, 1995; Fu, 1994). The ability of this information to be transmitted fully or embedded in the property markets in one quarter is further evidence of the structural and informational efficiency of the Hong Kong property markets compared with the US, UK and Australian property markets.

With the above general evidence of property company performance leading property market performance, regression models were developed to predict property market performance using this lagged property company performance. Property company returns and returns lagged one quarter and two quarters were used, with the resulting regression models given in Table X.

Property companies	Office	Property market			HK property performance linkages
		Retail	Industrial	Residential	
<i>Property developers</i>					
Hang Lung	0.01	0.06	0.03	0.01	<b>21</b>
New World	0.28	0.16	0.25	0.03	
Sino Land	0.09	0.13	0.09	0.13	
Cheung Kong	0.01	0.01	0.05	0.02	
Sun Hung Kai	0.01	0.03	0.05	0.01	
Henderson Land	0.05	0.02	0.10	0.01	
<i>Property investors</i>					
Great Eagle	0.09	0.03	0.07	0.12	
The Wharf	0.15	0.09	0.05	0.14	
Hysan	0.33	0.16	0.20	0.11	
Hong Kong Land	0.21	0.17	0.12	0.10	

**Table X.**  
Regression analysis ( $R^2$ )  
for property markets  
on lagged individual  
property company  
returns

While these regression models generally gave low  $R^2$  values, the models with the most predictive power were obtained for:

- office: Hysan, New World, Hong Kong Land;
- retail: Hong Kong Land;
- industrial: New World.

These models clearly indicate that, in addition to property company performance, a range of other economic factors are significant drivers of the Hong Kong property market.

### Presence of a “pure” property factor

Arbitrage pricing theory indicates that common, but unspecified factors may influence performance of property companies and property markets (Giliberto, 1990). These may be financial factors or property factors. The key concern is to identify whether a common “pure” property factor is present in both property companies and property markets that represents property market fundamentals and is not shared by the financial markets.

As per Giliberto (1990), regressions of the property company and property market returns on the Hang Seng returns strip out this stock market effect and produce residual series that are orthogonal to these factors. If a common factor is present, a correlation between the residuals should be observed, indicating significant co-movement between the two market returns. This should be a “pure” property factor.

Table XI presents the correlation between the residuals for each of the property companies and the office, retail, industrial and residential property markets. Based on these correlations, evidence of a common pure property factor is best reflected in:

**Table XI.**  
Correlations between  
residuals for Hong Kong  
property companies and  
property markets:  
1984-94

	Office	Retail	Industrial	Residential
<i>Property developers</i>				
Hang Lung	-0.00	(0.14)	-0.17	-0.03
New World	-0.01	-0.04	-0.15	-0.05
Sino Land	(0.24)	(0.30)	(0.23)	(0.20)
Cheung Kong	0.06	-0.03	-0.18	0.02
Sun Hung Kai	-0.09	0.00	-0.11	0.01
Henderson Land	-0.08	-0.10	-0.22	-0.01
<i>Property investors</i>				
Great Eagle	(0.18)	0.11	0.14	0.07
The Wharf	(0.27)	(0.26)	0.15	0.23
Hysan	(0.49)	(0.39)	0.38	(0.28)
Hong Kong Land	(0.24)	(0.19)	-0.02	0.27
Hang Seng Property	0.04	-0.01	-0.30	-0.02
<b>Note:</b> Largest correlation for specific property companies given in parentheses				

- office: Hysan, The Wharf, Sino Land, Hong Kong Land;
- retail: Hysan, Sino Land, The Wharf, Hong Kong Land;
- industrial: Sino Land;
- residential: Hysan, Sino Land.

with a common pure property factor more evident in the property investors than in the property developers. Strong evidence of a common property factor was not seen for the other property companies, nor in the Hong Kong property sub-index.

This result provides some degree of evidence for specific property companies in Hong Kong that some common element influences both property company and property market returns. As such, investors do capture some portion of property market returns by investing in Hong Kong property companies such as Hysan, Sino Land, Hong Kong Land and The Wharf. This presence of a pure property factor has also been observed for USA REITs (Giliberto, 1990), but not found to be present for property trusts in Australia (Newell and MacFarlane, 1995a).

With property companies accounting for over 25 per cent of total stock market capitalization in Hong Kong, it is possible that the stripping-out process used in this section as per Giliberto (1990) can also eliminate a significant property element. To overcome this concern, an adjusted Hang Seng index was derived by eliminating the effect of the property company sub-sector. Using this adjusted stock market series, Table XII presents the correlation between the residuals for each of the property companies and the office, retail, industrial and

	Office	Retail	Industrial	Residential	HK property performance linkages
<i>Property developers</i>					<b>23</b>
Hang Lung	0.00	0.13	-0.18	0.03	
New World	-0.01	-0.16	-0.03	0.02	
Sino Land	0.22	0.28	0.16	0.23	
Cheung Kong	0.06	-0.02	-0.19	0.07	
Sun Hung Kai	-0.07	0.01	-0.12	0.07	
Henderson Land	-0.06	-0.08	-0.20	0.06	
<i>Property investors</i>					
Great Eagle	0.17	0.11	0.10	0.11	
The Wharf	0.25	0.23	0.07	0.28	
Hysan	0.45	0.36	0.30	0.31	
Hong Kong Land	0.22	0.18	-0.05	0.30	
Hang Seng Property	0.03	0.00	-0.25	0.03	

**Table XII.**  
Correlations between residuals for Hong Kong property companies and property markets (using adjusted stock market series: 1984-94)

residential property markets. Only marginal differences occurred in these correlations compared to those obtained in Table XI, with identical conclusions derived. The equivalence of these results in Tables XI and XII reinforces the use of the readily available Hang Seng index as the most effective option to strip out the stock market effect.

### Granger causality analysis

To investigate the temporal relationship between property companies and the property market, Granger causality tests were applied, with lags of up to one year included. Granger causality investigates the ability of one return series to predict another, conditional on its own past values. This technique has been used previously to examine the linkages between REITs and the US property market (Myer and Webb, 1993; 1994) and the linkages between property trusts and the Australian property market (Newell and MacFarlane, 1995a).

Tables XIII to XVI present the Granger causality analyses for office, retail, industrial and residential property respectively. At an individual property company level, there is no evidence of Granger causality between Hong Kong property companies and property market returns. While not being significant, the strongest degree of Granger causality was seen for Cheung Kong and residential property, and Henderson Land and office property, both reflecting the substantive contribution of each property type to their respective portfolios. This lack of Granger causality for the individual Hong Kong property companies on the property market was generally consistent with the results from equivalent studies for USA REITs (Myer and Webb, 1993; 1994) and Australian property trusts (Newell and MacFarlane, 1995a).



**Table XIII.**  
Granger causality tests:  
property companies  
versus office property  
market

Dependent	Independent	Independent variable lags (regression coefficients)				Dependent variable lags (regression coefficients)				R <sup>2</sup>
		1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
HLD O	O HLD	-0.12 0.16*	0.21 -0.07	-0.93 -0.07	-1.01 -0.03	-0.28 0.47*	-0.11 0.09	-0.03 0.07	-0.00 -0.30	0.19 0.37
NW O	O NW	0.39 0.24*	0.64 -0.02	-0.65 -0.07	-1.19 -0.10	-0.48* 0.40*	-0.29 0.14	-0.07 0.10	-0.01 -0.22	0.31 0.60
SL O	O SL	0.17 0.10*	0.27 -0.06	-0.63 -0.02	-1.25 -0.00	-0.27 0.45*	-0.13 0.04	0.04 0.05	-0.17 -0.24	0.24 0.34
CK O	O CK	-0.49 0.15*	0.13 -0.07	-0.46 -0.13	-0.63 -0.05	-0.20 0.40*	-0.17 0.17	-0.07 0.06	-0.36 -0.33	0.29 0.41
SHK O	O SHK	-0.08 0.18*	0.32 -0.09	-0.51 -0.05	-0.87 -0.06	-0.50* 0.52*	-0.44* 0.05	-0.26 0.08	-0.28 -0.28	0.37 0.44
HL O	O HL	-0.39 0.16*	0.16 -0.06	-0.32 -0.11*	-0.60 -0.08	-0.31 0.44*	-0.21 -0.22	-0.05 0.09	-0.32 -0.36	0.27 0.57
GE O	O GE	0.24 0.13*	0.12 -0.06	-0.25 -0.02	-0.32 -0.02	-0.21 0.46*	-0.12 0.02	0.07 0.10	-0.24 -0.26	0.18 0.38
TW O	O TW	0.51 0.26*	0.20 -0.08	-0.52 -0.14	-0.77 -0.12	-0.53* 0.38*	-0.32 0.12	0.03 0.14	0.04 -0.23	0.34 0.49
HD O	O HD	0.30 0.23*	0.06 0.00	-0.26 -0.06	-0.45 -0.06	-0.27 0.28	-0.26 0.09	0.11 0.11	-0.31 -0.22	0.34 0.38
HKL O	O HKL	0.33 0.29*	0.23 -0.06	-0.47 0.00	-0.63 -0.09	-0.36* 0.44*	-0.14 -0.11	-0.13 0.21	-0.17 -0.19	0.26 0.47

**Notes:**

\* Significant at 5 per cent level

Notation for property companies as per Table V

Dependent	Independent	Independent variable lags (regression coefficients)				Dependent variable lags (regression coefficients)				R <sup>2</sup>
		1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
HLD	R	1.21	-2.10*	0.56	-1.35	-0.43	-0.52*	-0.12	-0.26	0.32
R	HLD	-0.01	-0.02	-0.03	-0.01	0.80*	-0.65*	0.42*	-0.40*	0.48
NW	R	0.60	-1.16	0.40	-1.09	-0.54*	-0.44	-0.17	-0.38	0.31
R	NW	0.05	0.01	0.01	-0.02	0.75*	-0.62*	0.41*	-0.34*	0.50
SL	R	0.58	-1.99	0.80	-1.84	-0.30	-0.38	-0.12	-0.38	0.24
R	SL	-0.02	-0.01	0.01	0.01	0.81*	-0.67*	0.39	-0.36*	0.48
CK	R	-0.13	-1.25	0.70	-1.08	-0.17	-0.21	-0.01	-0.46*	0.31
R	CK	0.01	-0.06	-0.05	-0.03	0.77*	-0.62*	0.39	-0.40*	0.51
SHK	R	0.16	-1.21	0.51	-1.11	-0.48*	-0.46*	-0.17	-0.38*	0.39
R	SHK	0.01	-0.05	-0.04	0.01	0.80*	-0.61*	0.37	-0.38*	0.51
HL	R	-0.55	-0.72	0.06	-1.06	-0.47*	-0.48	-0.25	-0.42	0.28
R	HL	-0.01	-0.02	-0.02	-0.01	0.79*	-0.66*	0.40*	-0.39*	0.48
GE	R	0.03	-1.18	0.83	-0.92	-0.27	-0.20	-0.06	-0.29	0.14
R	GE	0.02	-0.02	0.01	0.02	0.78*	-0.61*	0.35	-0.32*	0.49
TW	R	0.47	-0.85	0.52	-0.92	-0.26	-0.30	-0.13	-0.22	0.25
R	TW	0.01	-0.03	-0.03	-0.06	0.79*	-0.64*	0.43*	-0.36*	0.49
HD	R	0.16	-0.67	0.81	-0.99	-0.19	-0.29	-0.16	-0.33*	0.23
R	HD	-0.02	-0.01	-0.03	-0.03	0.81*	-0.67*	0.43*	-0.35*	0.48
HKL	R	0.82	-0.98	0.36	-0.81	-0.22	-0.25	-0.16	-0.28	0.30
R	HKL	0.05	0.01	-0.03	-0.04	0.76*	-0.62*	0.40*	-0.32*	0.49

**Notes:**

\* Significant at 5 per cent level

Notation for property companies as per Table V

**Table XIV.**  
Granger causality tests:  
property companies  
versus retail property  
market

**Table XV.**  
Granger causality tests:  
property companies  
versus industrial  
property market

Dependent I	Independent I	Independent variable lags (regression coefficients)				Dependent variable lags (regression coefficients)				R <sup>2</sup>
		1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
HLD	I	-1.03	-0.29	-0.83	-1.11	-0.35	-0.44	-0.26	-0.24	0.24
I	HLD	0.03	-0.03	0.06	-0.07	0.40*	-0.30	0.31	-0.08	0.27
NW	I	-0.96	0.06	-0.38	-1.05	-0.46*	-0.35	-0.27	-0.33	0.31
I	NW	0.08	0.03	0.06	-0.02	0.23	-0.22	0.28	-0.04	0.25
SL	I	-0.57	-0.32	-0.28	-1.85	-0.26	-0.28	-0.28	-0.31	0.17
I	SL	0.01	0.00	0.04	-0.06	0.40*	-0.32	0.31	-0.04	0.30
CK	I	-0.91	-0.72	-0.39	-0.76	-0.21	-0.19	-0.09	-0.34*	0.31
I	CK	0.06	-0.07	0.08	-0.09*	0.50*	-0.35	0.34*	-0.10	0.38
SHK	I	-0.80	-0.26	-0.19	-1.02	-0.44*	-0.38*	-0.25	-0.32	0.37
I	SHK	0.03	0.00	0.04	-0.01	0.30	-0.23	0.29	-0.08	0.18
HL	I	-1.11	-0.45	-0.13	-0.97	-0.42	-0.39	-0.28	-0.33	0.27
I	HL	0.04	0.00	0.04	-0.05	0.36*	-0.28	0.36	-0.09	0.28
GE	I	-0.29	0.15	0.17	-0.86	-0.26	-0.17	0.15	-0.21	0.11
I	GE	0.02	-0.01	0.05	-0.05	0.42*	-0.34	0.33	-0.09	0.30
TW	I	-0.49	-0.27	-0.41	-0.72	-0.24	-0.24	-0.17	-0.18	0.24
I	TW	0.06	-0.01	0.04	-0.11	0.34	-0.28	0.35	-0.04	0.28
HD	I	-0.36	-0.20	-0.03	-0.85	-0.19	-0.23	-0.19	-0.25	0.21
I	HD	0.05	0.00	0.06	-0.11	0.36	-0.30	0.31	0.02	0.33
HKL	I	-0.44	0.07	-0.17	-0.94	-0.16	-0.18	-0.27	-0.28	0.25
I	HKL	0.03	0.03	-0.01	-0.11	0.30	-0.25	0.38*	-0.12	0.25

**Notes:**

\* Significant at 5 per cent level

Notation for property companies as per Table V

Dependent	Independent	Independent variable lags (regression coefficients)			Dependent variable lags (regression coefficients)			R <sup>2</sup>		
		1Q	2Q	3Q	4Q	1Q	2Q		3Q	4Q
HLD	RES	-0.30	0.09	-1.20	-0.66	-0.37	-0.47	-0.15	-0.12	0.21
RES	HLD	0.06	-0.09	-0.01	-0.03	0.45*	-0.09	0.10	-0.32	0.34
NW	RES	-1.05	0.83	-1.05	-0.20	-0.25	-0.17	0.01	-0.08	0.26
RES	NW	0.01	-0.05	-0.07	-0.05	0.32	-0.12	0.24	-0.45*	0.30
SL	RES	-1.05	0.46	-0.75	-1.19	-0.15	-0.25	-0.20	-0.20	0.18
RES	SL	0.03	-0.07	-0.01	-0.01	0.42*	-0.05	0.09	-0.32	0.33
CK	RES	-0.85	0.04	-0.63	-0.50	-0.12	-0.12	-0.02	-0.29	0.28
RES	CK	0.12*	-0.12*	-0.05	-0.03	0.42*	0.04	0.11	-0.34	0.47
SHK	RES	-0.86	0.48	-0.91	-0.28	-0.34	-0.39	-0.16	-0.25	0.36
RES	SHK	0.08	-0.08	-0.05	-0.03	0.39	0.02	0.08	-0.34	0.35
HL	RES	-1.39	0.99	-1.19	-0.61	-0.26	-0.43	-0.25	-0.22	0.33
RES	HL	0.09*	-0.07	-0.03	-0.04	0.38*	0.06	0.06	-0.28	0.42
GE	RES	-1.47	0.81	-1.38	-0.10	-0.07	-0.13	-0.03	-0.10	0.22
RES	GE	0.03	-0.09*	-0.04	-0.02	0.39*	-0.04	0.07	-0.35	0.36
TW	RES	-0.38	0.96	-0.94	-0.18	-0.15	-0.33	-0.17	-0.11	0.26
RES	TW	0.12	-0.13	-0.06	-0.11	0.39	-0.01	0.14	-0.22	0.43
HD	RES	-0.25	0.63	-0.51	-0.37	-0.14	-0.30	-0.18	-0.20	0.20
RES	HD	0.11	-0.11	-0.03	-0.09	0.39*	-0.10	0.19	-0.28	0.41
HKL	RES	-0.50	0.62	-0.82	-0.27	-0.10	-0.22	-0.21	-0.22	0.25
RES	HKL	0.10	-0.06	-0.07	-0.10	0.31	-0.05	0.17	-0.24	0.32

**Notes:**

\* Significant at 5 per cent level

Notation for property companies as per Table V

**Table XVI.**  
Granger causality tests:  
property companies  
versus residential  
property market

### Conclusion

While there are fundamental differences between the characteristics of direct and indirect property, this research has highlighted a number of key issues in assessing the linkages between Hong Kong property company and property market performance that are important to property investors.

Hong Kong property company returns reflect important transaction-based information about property market fundamentals that is subsequently embedded or impounded into Hong Kong commercial property performance series, with this embedding in most cases taking one quarter. A range of unique structural features of the Hong Kong property market facilitate the speed of this impounding process.

As well as achieving liquidity and portfolio diversification, investors are able to capture some portion of Hong Kong property market returns by investing in certain Hong Kong property companies, with a common property element evident in both the indirect and direct property series. This feature was more evident among the Hong Kong property investment companies than the property development companies.

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