

The impact of announcement of land acquisition in auctions on real estate firms' stock return in Hong Kong

Abstract

The purpose of this paper is to examine the abnormal stock return of Hong Kong real estate firms following news of land acquisition and identify determinants to the abnormal stock return.

Design/Methodology/Approach

It employs the event-study methodology and multivariate regression to test factors that are hypothesized to have effects on the abnormal return.

Findings

The paper indicates that on land acquisition announcement there is a significant positive price reaction. Also the market capitalization and debt-to-equity ratio of a firm is associated negatively with the level of abnormal price reaction.

Practical Implications

This study has identified significant positive abnormal stock return following the news of land acquisitions by developers in the context of Hong Kong. It has also documented negative correlation between abnormal stock return and two specific factors of a firm, namely, market capitalization and debt-to-equity ratio.

Originality/Value

It identifies significant positive abnormal stock return pursuant to land acquisitions by

firms.

Keywords

Real Estate, Abnormal Return, Land Acquisitions, Hong Kong, Stock price

Research Paper

Introduction

Land has a fundamental role in a development perspective; and this is especially true in Hong Kong. In the Special Administrative Region, the entry barrier to real estate development is high, the size of land parcel is relatively large, and the whole development process is labour and capital intensive and self-built provision is extremely rare. With the increasing emphasis on Comprehensive Development by the government now, the construction of cultural, arts and technological infrastructure are always intertwined with real estate development; thus providing land availability with an even more influential role in overall society development.

With regard to this superior status, land economy in Hong Kong has received considerable interest among scholars. For example, Tse et al. (2001) studied the market concentration and profitability in Hong Kong land market. Hui (2004) investigated the relationship between land supply and housing price. Hui et al. (2004) explored the mechanism of land value capture in Hong Kong. Chiang et al. (2005) investigated the embedded real option in connection to the right to develop in Hong Kong land market.

Nevertheless, studies on how land acquisitions could affect the stock return of land

winners are relatively scarce in the literature. This gives a strong justification for this paper to examine how stock prices of Hong Kong property companies respond to the news of land acquisitions.

The purposes of this paper are twofold. The first one is to verify the existence (or absence) of abnormal stock return following land acquisitions in Hong Kong, and the second one is to investigate whether firm specific, land specific and market factors would have any influence on the magnitude of post-land acquisition stock price reaction by employing multivariate regression. The firm specific factors include business focus, debt-to-equity ratio, market capitalization and price-to-earning ratio. The land specific factor includes the degree of competition in a particular land auction. The market specific factor in the paper is the return of Hang Seng Index.

Literature Review

Abnormal stock return has been a heated research topic for decades. In the real estate field, a great deal of literature has suggested the occurrence of abnormal stock return following the debt and equity offering of the real estate firms and real estate investment trusts. Howe and Shilling (1988) found evidence of positive abnormal returns towards the debt offering of REITs and negative abnormal returns after equity offering using a set of US-based REITs. Likewise, Brounen and Eichholtz (2001) studied the post debt/equity offering stock price behaviour of European property companies and found a negative share price reaction to equity offering and a positive share price reaction to the announcement of debt offering. They also noted that these two reactions are less severe in low-tax countries and vice versa, which reflects the weight of the tax-free status of corporate debts. Gerbich et al. (1999) examined negative return after the equity issuance of property firms. As well, Ghosh et al. (1999,

2000) reported significant negative price reaction responding to REIT seasonal equity offering. Further, they found that the performance of property investment firms was more stable than that of property development firms after equity offering. Hui et al. (2005) suggested a negative relationship between equity offering and stock return using the data of Hong Kong property companies. Their study also found a positive relationship between debt offering and stock return.

Acquisitions and spin-offs are believed to be another stream of abnormal stock return initiator. Hite et al. (1984) documented significant positive abnormal return associated with spin-offs in the real estate operations in US. The general effect of spin off is found to be positive. Such abnormal return is even more significant in the context of a non-real estate firm trying to divest its real estate operation by spin-off. Allen and Sirmans (1987) found a significant positive gain on acquiring trust shareholder's wealth associated with REIT mergers. Campbell et al. (2001) found evidence of positive gains to acquiring firms in a public-private REIT merger. They attributed such gains to the information signals of using shares to finance the transaction. Campbell et al. (2003) found evidence of positive gains when REITs acquire real estate portfolios. However, there is also counter-evidence to the acquisitions and spin-offs synergies. Glascock et al. (1991) found no evidence of abnormal return on buyers' share price responding to real estate asset acquisition by non-real estate firms; while only a weak positive gain was identified on the sellers' share price. They attributed the weak (or zero) abnormal performance to the absence of restructuring incurred by the real estate asset acquisition (therefore no synergy is involved).

In relate to the evaluation of the impact of land acquisitions on stock return, the literature is considerably limited. Ooi & Sirmans (2004) found evidence of excess

returns associated with announcement of successful land acquisition (wealth effect) using a data set from Singapore. They discovered the magnitude of excess return was positively related to the level of uncertainty in a development process. This concurs with their hypothesis that excess return is related positively to the ability of the successful bidder to create value from the development process. Their studies found no evidence that successful land acquisition by a particular firm could have an effect on the returns of other Property Companies (i.e. an industry-wide wealth effect). Locally, Fu and Ching (2003) identified positive abnormal stock return (of 0.41 % at day 0) following land acquisitions news, using land auctions data in Hong Kong from 1986-1998.

This research serves as further research to that of Fu and Ching (2003) using a new set of data. It supplements the literature with up-to-date evidence of the land acquisitions impact on stock. It also examines whether the factors affecting the abnormal return pursuant to land acquisition identified by Ooi & Sirmans (2004) are valid in the context of Hong Kong.

Research Methodology

Event study methodology

Event study methodology was adopted to test the market's reaction toward successful land acquisition by listed companies. The mean adjusted model developed by Masulis (1980) was employed to assess the abnormal returns responding to the announcement of successful land acquisition.

An estimation window of -40 days to + 20 days was employed to monitor the stock performance prior to the land acquisition. The average return of the stock is defined as

the mean return of the stock from -40 days to +20 days.

$$R_{av} = \frac{1}{60} \sum_{t=-40}^{t=20} R_t \text{ --- Eq(1)}$$

After obtaining the average stock return for all 94 land acquisitions; the daily return of corresponding firms, from three days before to four days after(-3, -2, -1, 0 , +1 ,+2 , +3 , +4) the land acquisition was measured.

Then, the daily average abnormal return of land winning firm was worked out as follows:

$$AAR_t = \frac{1}{N} \sum_{i=1}^N (R_{ti} - R_{avi}) \text{ --- Eq(2)}$$

where AAR_t is the average abnormal return on day t surrounding the event of land acquisition; R_{ti} is the daily stock return on day t after the announcement of land acquisition; R_{avi} represents the average return of stock i and N is the number of acquisition examined.

In addition to the daily average abnormal return, the cumulative average abnormal return was calculated to examine the price effect in the three-day interval to smooth out fluctuation. In this paper, a three-day cumulative abnormal return was used:

$$CAAR_{t,t-1,t-2} = \sum_{t=t-2}^t AR \text{ --- Eq(3)}$$

Where $CAAR_{t,t-1,t-2}$ is the three-day cumulative average abnormal return on day t.

The adoption of a cumulative abnormal return is to address the possible inaccuracy tied with the “overshooting symptom” in response to market news as suggested by Hui et al. (2005).

The T-statistic for each AAR and CAAR were calculated to test the null hypothesis that the abnormal return on a particular day is zero.

Testing of industry wide abnormal return

After testing the hypothesis of zero abnormal return, the finding in Ooi & Sirmans (2004) that no significant impact was projected to the whole real estate industry when a particular real estate firm acquires land was tested.

Abnormal return of a portfolio representing the real estate industry was computed to sort out the potential industry effect. The same methodology as the one used in computing abnormal return for the land winning firm was adopted.

First, the average return of a portfolio representing the real estate and construction sector in the 60 days (from -40 days to + 20 days) estimation window was computed using equation (1). Next, the average abnormal return and cumulative average abnormal return for each event (land acquisition in auction) of the portfolio were

computed accordingly using equation (2) and (3). Then the null hypothesis of zero abnormal return was tested using the abnormal return of the portfolio.

Formation of portfolio

Intuitively the portfolio representing the real estate and construction sector can be expressed by the constituents of Hang Seng Property Index (HSPI). However, due to the constantly changing constituency of Hang Seng Property Index, it would be tedious, if not impossible to employ the aforesaid method. Moreover, Ooi and Sirmans (2004) pointed out that the contribution of a particular large developer's share price movement could contribute much to the movement to the local real estate sub-index, which results in inaccuracy of the test of industry-wide effect. That is especially true when the real estate market is dominated by a few large developers. Since a high market concentration is witnessed in Hong Kong's real estate and construction sector, in this study the option of using HSPI constituents as the portfolio representing the Real Estate and construction sector was abandoned.

An alternative adopted in this study was to formulate a portfolio of real estate focused land winners (as shown in Table 4a) in the past 10 fiscal years. For each event, the winner(s) for the particular site was excluded from the portfolio and the market value-

weighted returns of the portfolio are computed over the estimation window. This avoids taking account of land winning firm's stock return in each event, thus avoiding the potential inaccuracy of the test of industry-wide effect. In a case where the land winner is not considered as a real estate focused firm, the return of the whole portfolio of real estate focused firms, without stripping out of any firms, was measured as the real estate industry performance.

Regression analysis

After obtaining the abnormal stock price performance, multivariate regression was carried out to test possible factors that would have impact on the magnitude of the stock price reaction. Two factors suggested by Ooi & Sirmans (2004), namely, the property focus and financial leverage, were adopted in this study. Four other hypothesized factors were added and discussed in the following sessions.

Regression factors

Relative development experience----Property Focus of the winning firm (Variable PF)

Ooi and Sirmans (2004) suggested that the property focus of particular land winner could affect the amount of wealth that the land winner may generate from the

development process. This argument can be absorbed in a sense that firms focused in property development are more familiar with dealing with institutions in adopting permits and fulfilling social and environment requirements (such as including some area for public use and incorporating environmentally-friendly building design and material in the development) to obtain fringe benefits, such as non-calculable GFA and extra plot ratio than non-property focused firms.

As a preliminary test to substantiate the above arguments, land winners of auctions were classified into two categories. The first group included firms that had over 50 % or more of their average annual revenue in the past decade generated from real estate development; while the second group included firms that had less than 50 % of their average annual revenue in the past decade generated from real estate development.

Table 1 presents the groupings.

Take in Table 1

We then insert the property focus factor as dummy variable (1 for property focused and 0 for non-property focused) according to the above categorization.

Size of the winning firm – Market Capitalization (Variable MC)

Along with the property focus factor, the size of land winners was also considered influential to the magnitude of the abnormal return of the land winner's stock. It is

sensible to suggest that developers of scale can maximize the development potential of a particular piece of land better than their smaller scale rivals. Specifically, large developers can utilize their resource more cost-effectively due to economy of scale. Large developers usually have better quotes on material than their smaller rivals due to the large volume they consume. Some of the big developers like the Cheung Kong Holdings or Sun Hung Kai Properties even have their own subsidiaries for the supply of construction material production. Also, large developers are presumed to have better bargaining power on relaxation of land covenants and permits.

Financial leverage of the winning firm---Debt to Equity Ratio (Variable DER)

Regarding the maximization of land development potential, alternative theories do exist in the literature. Halpern (1983) argued that as a consequence of the moral hazard problem, managers could be inclined to over-invest in non-profitable projects. Ooi and Sirmans (2004) suggested that highly leveraged firms had less scope to engage in investment in non-profitable projects because of the monitor of creditors. A positive relationship was therefore hypothesized between abnormal gains associated with land acquisition and land winner's debt to equity ratio prior to the land acquisition.

Relative earnings of the winning firm—Price to Earnings Ratio (Variable PER)

The price to earnings (PE) ratio is often set as an indicator of the worth-of-money in equity investment. A lower PE ratio implies less capital involvement in profits generation. Investors are prone to acquire equities of lower PE ratio when comparing two equities with a similar outlook. Therefore, in this study a negatively relationship between the PE ratio and the abnormal gains, or, a positive relationship between the PE ratio and the abnormal loss is hypothesized. In other words, it is believed that

market players will prefer real estate developers' share of a lower PE ratio when making speculation of the land acquisition news.

Degree of competition for a particular piece of land ---Percentage Increment from the opening bid (Variable PI)

In the auction literature, auction winners are believed to have earned economic rents for an amount that they shade their bid which depends upon the degree of competition faced, which according to Quan (1994) reflects the number of rival bidders and the degree of competition. Ooi & Sirmans (2004) quantify the degree of competition in the auction regarding a particular piece of land by the number of bidders. In this study, the percentage increment from the opening bid was adopted as a measure to indicate the degree of competitiveness in an auction. It is hypothesized that the greater the amount of increment from the opening bid, the greater the competition for a piece of land; and hence the less economic rent the land winner earns. Thus, a negative relationship between the percentage increment from the opening bid and the abnormal gains was hypothesized.

Market Factors--- Return from Hang Seng Index (Variable DRHSI)

The daily market return of land developers necessarily depends on a range of factors, including the injection of new market information, the outlook of particular developers, the trend of real estate prices, the liquidity of particular developers, etc. However, apart from these firm-specific news and information; the market atmosphere of daily stock trading has a pronounced impact on the share price of land winners in the observation window. It is true that while the market has a loss of confidence, or, for instance, a particular investment bank faces liquidity problem, the

woes posed from the financial sector may well outweigh the new market information injected from the real estate sector. As to capturing the effect of market atmosphere, the daily return of the Hang Seng Index was adopted as a measure of market atmosphere

Take in Table 2

Regression Model

In this study, two different models were formulated to accommodate different possibilities; Model 1 was used to carry out multivariate regression for abnormal returns while Model 2 was used to carry out multivariate regression for cumulative abnormal returns. In this study, the set of ARs and CARs value will be regressed against the six aforementioned factors if the set of ARs or CARs value can substantiate the null hypothesis of zero abnormal returns at 5 percent significance level.

Model 1:

$$AR_{it} = \alpha_1 + \beta_1 PI + \beta_2 DER_i + \beta_3 MC_i + \beta_4 PER_i + \beta_5 PI_i + \beta_6 RHSI_i + \varepsilon_i$$

Model 2:

$$CAR_{it} = \alpha_1 + \beta_1 PI + \beta_2 DER_i + \beta_3 MC_i + \beta_4 PER_i + \beta_5 PI_i + \beta_6 RHSI_i + \varepsilon_i$$

Data Collection

Detailed land auction data of 94 land transactions from 1997 to 2007 was obtained from the Lands Department.

Land auction data was recorded according to the fiscal year rather than chronological year, as in the Lands department data. There are in total 94 land acquisitions by auction, involving both listed and non-listed companies, throughout the last 10 fiscal years.

Among those 94 land acquisitions, some 57 auctions are with the land winner identified with listed mother companies, making these acquisitions suitable for the purpose of this study.

The summary of the 57 land auctions are tabulated below. Table 3 presents the summary of land auction data in the past 10 fiscal years.

Take in Table 3

It is noteworthy that the majority of land sold in land auctions are acquired by listed companies. In the fiscal year 1998-99 and 2005-06 all land at auction was sold to listed companies. The overall predominance of listed companies in land acquisition in auctions contributes to the reliability of this study.

Treatment of irregularities

Among those 57 eligible land auctions, 10 transactions were found to be joint ventures involving participation of listed companies, in which the possession of land

jointly owned by listed and non-listed companies; or jointly owned by several listed companies. For the purpose of this study, while there was a joint venture between a listed company and a non-listed company, the abnormal return of the listed company was recorded as the observation tied with that land acquisition by auction. Where there is a joint venture between several listed companies, all involved companies (regardless the share it owns regarding a specific piece of land) were regarded as a land winner. Their corresponding stock price in the observation window was recorded and the abnormal return computed. Under this interpretation of data; there were 60 observations of listed companies' share price data in the date around their acquisition of land in auction.

In the case that a single developer won more than one piece of land within one day, only one observation was allowed. While a developer acquired multiple pieces of land, land acquisition with the largest sum of premium paid was included as an observation. Where a developer acquired multiple pieces of land, some of which were solely owned while some of them involved joint ventures, the acquisition solely owned by that particular developer is included as an observation while the joint venture acquisition was not included as an observation. In the sample of this study, four observations were deleted to avoid duplication where joint ventures acquisition of another piece of land was acquired by a particular developer on its own. No observations are deleted under the treatment to delete acquisitions of lesser premium paid concerning multiple land acquired by a single developer.

Results and findings

Results of testing of abnormal return of land winners' stock

Table 4 presents the result for stock price reaction responding to land acquisitions in

auctions. The results corroborate with Ooi and Sirmans (2004) and Fu and Ching (2003). Evidence of significant abnormal returns was found in the announcement day of successful land acquisition. The magnitude of abnormal gains was found to be 1.47 percent on the announcement day, which is a more pronounced figure, compared to the abnormal gains 0.69 percent in the study of Ooi and Sirmans (2004) and 0.41 percent in the study of Fu and Ching (2003). In this study, no significant abnormal return was found except on the announcement day (1.47 percent, t-statistic = 2.55). No ARs or CARs substantiated the null hypothesis of zero abnormal return at 5 percent significance level, except for the announcement day of land acquisition ($t=0$).

Take in Table 4

Since most of the abnormal return associated with land acquisitions in auctions was captured on the announcement day, Model 1 is adopted for the purpose of multivariate regression.

Constituents of portfolio representing real estate sector

A portfolio to measure the industry wide effect of government selling land was formed, as stated in the previous part, comprising all property-focused stock in Table 1. The weight of particular firms in the portfolio was designated according to its market capitalization as of 1 March 2008. Figure 1 illustrates the constituency of the portfolio representing the real estate sector.

Results of Testing of industry wide abnormal return

Table 5 presents the results in event study methodology using the ARs and CARs of the portfolio representing the real estate sector. Supportive evidence to Ooi and

Sirmans (2004) is found. None of the AR and CAR substantiated the null hypothesis of zero abnormal return at 10 percent significance level or better. Therefore it can be concluded that the impact of land acquisition of particular firm on industry wide stock return is not significant.

Take in Table 5

Results of multivariate regression

Table 6 presents the summary on explanatory variables for the regression analysis

Take in Table 6

Table 7 presents the results for the regression model. Comparing with Ooi and Sirmans (2004), our regression has a better R^2 value of 0.172, as compared to 0.153. This indicated a better degree of fit in our model. Amongst the regressed factors, market capitalization and the constant term were found to be significant at 5 percent significance level. The debt-to-equity ratio was found to be significant at 10 percent level. Surprisingly, the regression model in this study suggested a negative relationship between abnormal gains and market capitalization, as well as between abnormal gains and debt-to-equity ratio.

The explanation of the negative relationship with market capitalization can be twofold. A possible explanation includes land acquisition by smaller firms may result in a more profound positive effect on the outlook of that particular land winning firms, as compared to the effect of the land acquisition of same size to their industry leader. On the other hand, the negative correlation may be interpreted in a speculator perspective.

The stock prices of smaller real estate firms are more easily manipulated considering their relatively small market capitalization. Thus speculators may attempt to push up the stock price of a particular firm while there is positive market news for small firms and carry massive sales at an elevated stock price level afterwards. The negative correlation between the abnormal gains and debt-to-equity ratio can be interpreted in terms of the general inclination for investors to put their bets on financially less leveraged firms. Lastly, it comes to our surprise that the return of land winners on the acquisition day (day 0) is not in statistically significant correlation with the market return, which suggested a decoupling effect from the market when land acquisitions is made by real estate firms.

Take in Table 7

Conclusion

This study examined how stock price responds to land acquisitions by listed companies in Hong Kong by using the event study methodology. In general, there was a positive impact of land acquisitions to land winners, averaging 1.47 % in the sample of this study. The null hypothesis of zero abnormal return was rejected at 1% significance level by using the data of announcement day land winners' stock return. It can be concluded that abnormal returns exist on land winners' share on land acquisition day.

Corroborating with Ooi and Sirmans (2004), no evidence of an industry-wide abnormal return was found. This indicates that the market does not interpret the action of land sales as a piece of positive news to the whole real estate industry. Further, the market capitalization and debt-to-equity ratio of the land winners is found to be in negative correlation with the abnormal stock return. This can be explained in terms of

speculators' preference on small-cap stocks, in view of their ease to rally, and investors' preference on financially less leveraged firms, concerning the better representation of equity value. Lastly, no statistically significant correlation is identified between the market return and land winners' stock return on the acquisition day, which suggests a decoupling effect of the land winners' share from the market. The discovery of such decoupling effect provides scope for future research.

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Real estate focused firms	Non-real estate focused firms
0001 Cheung Kong Holdings	0131 Cheuk Nang Holdings
0012 Henderson Land	0214 Asia Orient Holdings Limited
0016 Sun Hung Kai Properties	0355 Century City (Nominees) Limited
0083 Sino Land	0393 Gloruis Sun Enterprise Limited
0101 Hang Lung Properties	0559 FT Holdings Limited
0127 Chinese Estates Group	0611 Tack Tsin Holdings Limited
0129 Asia Standard International Group Limited	
0158 Melbourne Investment	
0173 K.Wah International Holdings	
0316 Orient Overseas International Limited	
0369 USI Holdings	
0683 Kerry Properties	
0688 China Oversea	

Table 1 ---List of real estate focused and non-real estate focused firms

Variable	Definition
Property Focus(Variable PI)	Dummy variable equal 1 if the winning bidder's main business is in real estate , 0 otherwise
Financial Leverage (Variable DER)	Debt-equity ratio of the winning bidder
Size of Winning firm (Variable MC)	Market Capitalization of the winning bidder
Relative earning power of the winning firm (Variable PER)	Price to Earnings ratio of the winning firm
Degree of competition for that particular auction (Variable PI)	Percentage increment of a particular auction from the starting bid.
Market Factors (Variable RHSI)	Market Return of Local Index (Hang Seng Index)

Table 2 --- Summary of explanatory variables

Fiscal Year	Number of land auction	Number of land acquired by listed companies	Amount of area sold (m ²)	Government revenue from land auction (HKD /Millioon)	Government revenue from land sold to listed companies(HKD /Millioon)	Percentage of land revenue contributed by listed companies
1997-98	17	5	164004	16760.6	8874	52.95
1998-99	2	2	5448	1570	1570	100
1999-00	17	11	117563.8	5392.7	4948.2	91.76
2000-01	13	10	132398.8	8380.5	8165	97.43
2001-02	12	7	82064.8	2683	2128	79.31
2002-03	8	2	53909.6	3765	2210	58.70
2003-04	0	0	0	0	0	N/A
2004-05	5	4	58610	18085	17075	94.42
2005-06	3	3	28035	10150	10150	100
2006-07	9	8	77259	13340	12770	95.73
2007-08	8	5	106103	26022	23800	91.46
Total	94	57	825396	106148.8	91690.2	86.38

Table 3---Summary on land auction data in Hong Kong from fiscal year 1997-98 to 2007-08

Day relative to land auction date	Average abnormal return	Standard Deviation	T-statistic	Cumulative average abnormal return	Standard Deviation	T-statistic
-3	0.001904	0.029	0.410	N/A	N/A	N/A
-2	-0.00332	0.031	-0.946	N/A	N/A	N/A
-1	-0.00072	0.031	-0.212	-0.00312	0.046	-0.488
0	0.011829	0.035	2.55**	0.00732	0.048	1.209
1	-0.00528	0.034	-1.155	0.00613	0.049	0.999
2	0.005366	0.032	1.313	0.012423	0.069	1.430
3	-0.00146	0.040	-0.173	-0.00046	0.060	-0.072
4	0.001246	0.041	0.286	0.006058	0.074	0.659

Table 4 ----Analysis of land winners' share price on land auction date, AARs and CAARs

*** indicates significance at 10 percent level**

**** indicates significance at 5 percent level**

***** indicates significance at 1 percent level**

Day relative to land auction date	Average abnormal return	Standard Deviation	T-statistic	Cumulative average abnormal return	Standard Deviation	T-statistic
-3	0.0004	0.1661	0.197	N/A	N/A	N/A
-2	-0.0012	0.2056	-0.441	N/A	N/A	N/A
-1	-0.0017	0.2473	-0.533	-0.0024	0.04687	-0.405
0	0.0001	0.1936	0.042	-0.0028	0.03952	-0.543
1	-0.0019	0.1955	-0.755	-0.0035	0.03399	-0.798
2	0.0006	0.2086	-0.211	-0.0024	0.03085	-0.595
3	0.0004	0.1874	0.177	-0.0020	0.03423	-0.463
4	0.0049	0.2513	1.519	0.0048	0.04056	0.914

Table 5 ---Analysis of real estate sector portfolio on auction date, AARs and CAARs

Variable	Definition	Mean	Standard Deviation
Abnormal Return on day 0 (AR_{0i})	Abnormal Return on day 0	0.0147	0.03516
Property Focus (Variable PI)	Dummy variable equal 1 if the winning bidder's main business is in real estate , 0 otherwise	0.9	0.30253
Financial Leverage (Variable DER)	Debt-equity ratio of the winning bidder	46.9303	62.79221
Size of Winning firm (Variable MC)	Market Capitalization of the winning bidder	77700.4908	89280
Relative earning power of the winning firm (Variable PER)	Price to Earnings ratio of the winning firm	38.1533	170.39
Degree of competition for that particular auction (Variable PI)	Percentage increment of a particular auction from the starting bid.	50.4528	39.22884
Market Factors (Variable RHSI)	Market Return of local Index (Hang Seng Index)	0.0010	0.01708

Table 6 Summary on explanatory variables of multivariate regression

	Standardized Coefficient(T- statistic)
Constant	0.046(2.146)**
Property Focus(Variable PF)	-0.124(-0.797)
Debt to Equity Ratio of the winning bidder (Variable DER)	-0.269(-1.731)*
Market Capitalization of the winning bidder (Variable MC)	-0.31(-2.237)**
Price to Earnings Ratio of the winning firm (Variable PER)	-0.190(-1.497)
Percentage Increment of a particular auction from the starting bid. (Variable PI)	-0.025(-0.171)
Return of local Index (Variable RHSI)	0.23(1.51)
F-statistic	1.841
R ²	0.172

Table 7 ---Coefficients of multivariate regression models of post-auction price reaction on different factors

*** indicate significance at 10 percent level.**

**** indicate significance at 5 percent level.**

***** indicate significance at 1 percent level.**

Fig 1 Constituency of portfolio representing the real estate sector

