Marketing Time and Pricing Strategies

by
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Abstract
This study examines the relationship between above-market price (or overpricing), along with various housing attributes, and time on the market (TOM). The study covers nearly 4,000 transactions of marketed domestic units of different living tenures, flat sizes, price ranges, and other physical characteristics in the Hong Kong residential property market. The results show that factors such as the above-market price, a flat’s tenure status, general property price trend, and unemployment rate have significant impacts on TOM. Nonetheless, the aforesaid only is applicable to the sub-period investigations. It should be noted that their respective impacts adjust overtime. Specifically, the effectiveness of overpricing as a pricing strategy depends on the economic situation by the time in when a property is transacted, as well as the supply/availability of other alternatives on the housing market. When either housing supply on the market is limited due to mounting negative equities, searching cost for properties were larger to the point where it is easier for sellers to make profits from a higher listing price. Also, when expectations of even higher property prices in the future have been formed, buyers may take an offer although the list price is higher than the expected sale price. Both scenarios result in quicker transactions or lower TOMs. However, higher TOMs arise when the negative equity situations are improved. It indicates lower searching cost for the buyers to obtain information for better bargains and higher sensitivities towards overpricing strategies deployed by the sellers.

Key words: time on the market (TOM), residential properties, Hong Kong, searching cost
1 Introduction
In the valuation world, property appraisers all too frequently relate marketing time to the estimated capital value of a real property, for example, for their definition of “market value” or “open market value”, a “reasonable” time period in the market is assumed\(^1\). Aside from various housing characteristics, other important elements that can influence the incentive to buy are the sellers’ initial asking prices and their expectations of the selling price. While housing characteristics generally remain static over a long period of time, list prices, consumers’ preferences and price aspirations and expectations may change over time. Although one would argue that the housing attributes may also undergo dramatic changes, such as urban renewal or redevelopment, it is usually an exception rather than a norm.

An optimal asking price and optimal time-on-market would maximize the net realizable return from residential sales. From a seller’s perspective, one question asked is whether he/she is able to obtain a higher selling price over a longer period of time; or just settles for a lower selling price over a shorter period of time. The question that follows may be: what is an optimal selling period if the property is sold at the current market value? From a buyer’s perspective, he/she would look for the best possible price for a flat of his/her liking, subject to the amount of information and searching cost that this potential buyer perceives. In other words, how much a seller could gain over the average market price depends on how much a potential buyer is willing to spend, whether in terms of time or money, on searching for relevant market information and similar flats available on the market. Such considerations dictate the time-on-market (TOM) for a flat on sale and the seller’s realized return above market price (the tradeoff). If the buyer’s searching cost exceeds the seller’s potential gain through a higher list price, the transaction is likely to take place sooner, thus a shorter TOM, and vice versa. The latter scenario could reach a point where transactions fall through. For instance, Anglin (1994) reported that 30 to 50 percent of negotiations ended without a transaction and Anglin et al.
(2003) noted that about 40 percent of house listings ended without a sale.

But the main problem remains: could sellers with higher selling costs achieve a faster sale, and at the same time, a maximum realizable return? Alternatively, could sellers benefit from longer marketing time in terms of achieving greater real selling prices? If not, what is the optimal pricing strategy such that a seller could achieve the greatest net present value of the selling price in an optimal marketing time, without prior knowledge of the buyer’s searching and information costs? This study examines the list price, the expected sale price and the time on market in the secondary market under different living tenures, flat sizes, price ranges, over (under)-priced properties and other physical characteristics. Previous studies have examined the overseas markets while this study focuses on Hong Kong’s residential market.

This paper is organized in four sections. Following this introduction, section 2 provides the literature review on the time-price relationship. Section 3 presents the study methodology. Section 4 describes the data source. Section 5 presents the empirical results and the last section concludes the study.

2 Literature Review
Prior to a transaction for real properties, sellers have to decide whether to maximize selling price or to minimize time on the market (Miller, 1978; Trippi, 1977). For the former, according to Knight (2002), a seller’s search is led by a desire to maximize the discounted present value of realized profits from a transaction through a listing price that balances the marginal costs of continuous searching with the marginal benefits of accepting an offer at present. In the meantime, a buyer faces a similar problem, as he/she searches on the housing market for one particular property which maximizes his/her utility level (Knight, 2002). Based on such interactions between buyer and seller, a logical progression of is how to reach that optimal list price for the seller. According to Merlo and
Ostalo-Mauge (2004), it is typically assumed that a seller faces a trade-off between the rate of arrival of buyers and the sale price. In other words, a lower list price increases the arrival rate of buyers but reduces the chances of high-price transaction (Haurin, 1988). To look at the list price from another perspective, Horowitz (1992) and Yavas and Yang (1995) suggest that it has two different roles. List price is either the seller’s reservation price or an upper bound for the seller’s reservation price which will be acceptable when a prospective buyer matches the offer.

Specifically, a seller’s choice of an offer price is a function of market price for the seller’s home, its characteristics, and the availability of properties in the market (Mayer, 1995). Subsequently, this list price influences the arrival rate of buyers, as well as the distribution of bids from them. However, one reason for sellers to set a higher list price is that they have higher loan-to-value ratio, as discovered in an investigation of the Boston condominium market by Genesove and Mayer (1997). They also have a higher expected TOM and tend to obtain higher transaction prices than owners with proportionately less debt.

For the latter, TOM has been studied in three different dimensions. The first dimension is the relationship between TOM and price concession ratio; the second is that between TOM and sale price. The last dimension focuses on the how search theory explains TOM (Kalra and Chan, 1994). With regard to the first dimension, it has been shown in Belkin et al. (1976), Kang & Gardner (1989), and a more recent study by Leung et al. (2002), that TOM has a positive correlation with the ratio of list price to sale price. Kalra and Chan (1994) have a similar finding, although the impact of price concession appears to be more noticeable for the transactions of higher-priced homes. However, it is not always the case, as Jud et al. (1995) report no significant impact of price concession on time on the market. Instead, they find that TOM is influenced by the standard deviation in sale price. They suggest that a wider distribution of prices may encourage sellers to hold out for higher transaction
prices, therefore resulting in a longer TOM.

Meanwhile, some other researchers have concentrated their efforts on examining the relationship between TOM and sale price. Yet, the resulting empirical evidence on this matter has been mixed and somewhat inconclusive. Specifically, the sign on TOM has been found to be rather unpredictable (Asabere et al., 1993). For instance, some studies have discovered a positive correlation between TOM and sale price (for instance, Trippi, 1977; Miller, 1978; Asabere and Huffman, 1993), whereas an inverse relationship between the two was found in Cubbins (1974).

From a theoretical standpoint, search theory has been frequently used to explain the tradeoff relationship between sellers’ choice for listing price and time-on-market. Generally speaking, the search theory usually assumes a direct relationship between selling price and TOM. Sellers are willing to wait longer for the probability of a better offer from a buyer (see Miller, 1978; Turnbull and Sirmans, 1993; Merlo and Ortalo-Magne, 2004). Yet this may not always be the case, as potential buyers might regard properties which remain unsold for a relatively long period of time as detective. According to Taylor (1999), this situation constitutes a phenomenon called negative herding. Under which, a longer time-on-market may result in a lower sales price.

A number of papers have also linked sellers’ pricing strategies to TOM. It is often found that the more overpriced a flat, the slower it will be sold, as shown on numerous occasions in the literature such as Miller (1978), Ong and Koh (2000), Anglin and Wiebe (2004), Li (2004) and Merlo and Ortalo-Magne (2004). Asabere et al. (1993) report that the both overpricing and underpricing strategies would prevent sellers from achieving the optimal TOMs that correspond to the highest sale prices (in net present values).
Besides property prices, housing characteristics are other important determinants of TOM. Miller (1978) points out that, given a housing supply and demand conditions, a property’s TOM is a function of its attractiveness (attributes) in comparison to other properties on the market. A key element of a flat’s attractiveness is its age. However, there has been no consensus about how age affects time on the market. For instance, Zuehlke (1987) reports that the age of a property is an important determinant of TOM, but Kalra and Chan (1994) and Ong and Koh (2000) reach a different conclusion. On the other hand, Haurin (1988) suggests that TOM is directly affected by the atypicality of a house. In other words, it takes more time for properties with more unusual features to market before they can be transacted (Kalra and Chan, 1994). For example, it is found by Ong and Koh (2000) in a Singaporean study that condominiums on lower floors tend to have longer TOM. Li (2004) found that property characteristics, such as pool view, number of bedrooms or toilet and private enclosed space, are not significant in explaining the time on market. But properties on higher floors, with southern or northern facing, and with more convenient traffic will have shorter marketing time.

Researchers have also studied the impact of (housing or financial) market conditions on TOM. It has been reported in several studies (e.g. Anglin et al., 2003; Kalra and Chan, 1994; Yang and Yavas, 1995a; Haurin, 1988) that TOM is influenced by both local and national economic conditions as well as being subject to strong seasonal effects. In a recent study conducted by Leung et al. (2002) in Hong Kong, the inflation factor is another critical factor besides price ratio that influences TOM.

3 Study Methodology
This study seeks to provide some empirical insight into the effects of various factors on TOM. In particular, we hypothesize that both the above-market price and the expected sale price have direct influences on TOM. The precise meaning of ‘above-market price’ has to be defined carefully,
however. Yavas and Yang (1995) point out that it is potentially problematic to regress TOM on sale price (or likewise, on the ratio of sale price to list price, etc.) because of the simultaneity of the two quantities. (Some papers that we have mentioned in the literature review, such as Belkin et al. 1976 and Kang and Gardner 1987, are susceptible to this problem, although some of their authors like Cubbin 1974 are aware of this fact.) To resolve this simultaneity problem, it is now popular to adopt a two-stage approach. The first stage is to use hedonic regression to obtain the expected value of sale price (or list price if needed). Jud et al. (1996), for instance, perform an ordinary least square (OLS) regression of sale price $P_S$ on certain housing or neighborhood characteristics $X$:

$$ P_S = H'X + \varepsilon_p. \quad (1) $$

The expected sale price $\overline{P_S}$ is then obtained as the predicted value of the sale price:

$$ \overline{P_S} = H'X. \quad (2) $$

In the second stage, the expected prices obtained from the first stage are used as explanatory variables (among other variables) for modeling TOM. Cox’s (1972) proportional hazard model has now become well-known. Suppose TOM is a continuous random variable. Let $f(t)$ denotes the probability density function of TOM, $F(t) = \Pr(\text{TOM} \leq t)$ its cumulative distribution function and $S(t) = \Pr(\text{TOM} \geq t) = 1 - F(t)$ its survival function, then its hazard rate

$$ h(t) = f(t)/S(t). \quad (3) $$

The hazard rate measures the likelihood that a housing unit will be sold at time $t$, given that it has not been sold at time $t$. If two houses A and B have hazard rates $h_1(t)$ and $h_2(t)$ respectively, with $h_1(t) \geq h_2(t)$ for all $t$, then house A tends to have a shorter TOM than house B does. Now, in Cox model, the hazard function of TOM is assumed to take the following form:

$$ h(t) = h_0(t) \Lambda(X, Z), \quad (4) $$

where $h_0(t)$, called the baseline hazard rate, is a nonnegative function of time and $\Lambda$ is a time-independent function that may depend on some housing attributes $X$ (age of property, number of bedrooms, whether it is near the central business district, etc.) some other variables $Z$ that affect both
TOM and home prices (months of inventory, velocity of sales, $\bar{P}_S$, $P_L$, mortgage interest rate, unemployment rate, consumer price index, gross domestic product, etc.). Different definitions of $h_0(t)$ and $\Lambda$ give rise to different models of TOM. For example, Jud et al. (1996) assumes that

$$h_0(t) = pt^{p-1},$$

$$\Lambda = \exp(-\beta_0 - B'X - C'Z),$$

where the log price difference $\log(P_L / \bar{P}_S)$ is included in $Z$ as a measure of above-market pricing.

$h_0(t) = pt^{p-1}$ is the baseline hazard rate of the Weibull distribution. When $p = 1$, the baseline hazard rate becomes constant and the density function of TOM decays exponentially. Hence Cox model reduces to the Exponential model in this case.

Cox models are not the only hazard models that appear in TOM literature. The semi-log regression in (3), for instance, can be recasted as a hazard model with the following density and survival function:

$$f(t) = \varphi[\log(\Lambda t)/\sigma]/(\sigma t),$$

$$S(t) = \Phi[-\log(\Lambda t)/\sigma],$$

where $\sigma$ is the standard deviation of $\epsilon_{TOM}$ in (3) and $\varphi$, $\Phi$ are respectively the density function and cumulative distribution function of the standard normal distribution. This model is sometimes called the log-normal model as TOM follows a log-normal distribution in this case. Another model that has appeared in the literature is the log-logistic model (see e.g. Glower et al. 1998), in which

$$h(t) = p\Lambda t^{p-1}/(1+\Lambda t^p),$$

$$S(t) = (1+\Lambda t^p)^{-1}.$$

Note that these two models are not proportional hazard models, so we do not speak of their baseline hazard rates. At any rate, given that $\Lambda(X, Z)$ is fixed, the Cox model, the log-normal model and the log-logistic model are all one-parameter models.

In this study, we will adopt the aforementioned two-stage approach to examine the relationship
between TOM, above-market price and list price. However, in the first stage, since the hedonic regression (1) obviously may lead to negative sale price, we opt to follow Anglin et al. (2003) and use a semilog-regression in the first stage. Moreover, while many authors (such as Jud et al. 1996 and Ong and Koh 2000) regress the sale price on housing characteristics, we do not see a priori why the sale price $P_s$ depends only on housing characteristics $X$ but not on the variables in $Z$. Therefore we will include both $X$ and $Z$ as dependent variables. In addition, to reduce noises from a fluctuating interest rate environment, we will discount the sale price first using the best lending rate. In sum, instead of (1) we will consider the following hedonic regression:

$$\ln(P_s) = H'X + K'Z + \varepsilon,$$

(11)

The above-market price is then defined as:

$$\Delta = \ln(P_L) - E(\ln(P_s)).$$

(12)

Regarding (13), it should be worth noting that the formation of $\Delta$ is somewhat similar to the concept of Degree of Overpricing (DOP) in Anglin et al. (2003), with the difference being that the expected transaction price, instead of expected list price, is being used for the computation of $\Delta$ for this study. Although there might be issues relating to simultaneity bias, there is an expected relationship between list price and expected discounted selling price (unlike expected list price, this is a realized, transaction price that buyers are able to obtain). This somehow drives the negotiation process and determines TOM. $\Delta$ would be a good measure of the effect upon TOM.

The variables in $X$ and $Z$ are as follows:

$\ln($SIZE$)$ is the natural logarithm of the size (in square feet) of the housing unit;

KLN is a dummy variable that the housing unit for sale is located in the Kowloon Peninsula;

NT is a dummy variable that the housing unit for sale is located in the New Territories;
E, S, W, N, NE, SE, and NW are dummy variables that represent the orientation of the housing unit (the direction where the living room of an apartment is facing);

VACANT is the dummy variable that the housing unit is in vacant possession;

OWNER is the dummy variable that the housing unit is owner-occupied;

RENTER is the dummy variable that the housing unit is renter-occupied;

FLOOR is the floor level of the housing unit;

SPACES is the number of parking spaces entitled to the housing unit;

BEDROOMS is the number of bedrooms;

CLUBHOUSE is the dummy variable that there is a club house;

POOL is the dummy variable that there is a swimming pool;

RPPI is the return (rate of change) of the property price index, computed by the Rating and Valuation Department, the HKSAR Government, on a monthly basis;

UNEMPLOYCH is the changes in unemployment rate in Hong Kong.

Initially we intended to include other variables, such as the rate of change in property price/rental index (RPPI/RPRI), the year-to-year growth of the consumer price index (CPI/YPERCH), changes in the best lending rate (BLRCH), adjustments in the median household income (ROCINCOME), along with changes in unemployment rate (UNEMPLOYCH) in the vector Z. However, as Table 1 shows, these variables are highly correlated. Therefore, to avoid multicollinearity and to keep the hedonic regression parsimonious, we include only RPPI (which is only slightly correlated with other variables) and UNEMPLOYCH (which is also included in, e.g., Jud et al. 1996) but not other economic variables in the hedonic regression.

**Table 1. Correlation between selected economic variables between January 2003 and June 2006.**

<table>
<thead>
<tr>
<th></th>
<th>RPPI</th>
<th>BLRCH</th>
<th>UNEMPLOYCH</th>
<th>CPI/YPERCH</th>
<th>RPPI</th>
<th>ROCINCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPPI</td>
<td>1</td>
<td>-.065</td>
<td>-.259</td>
<td>-.091</td>
<td>.362*</td>
<td>.443**</td>
</tr>
<tr>
<td>BLRCH</td>
<td>1</td>
<td>-.008</td>
<td>.370*</td>
<td>.197</td>
<td>.165</td>
<td></td>
</tr>
<tr>
<td>UNEMPLOYCH</td>
<td>1</td>
<td>-.129</td>
<td>-.531**</td>
<td>-.403**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In the second stage, the Cox model will be deployed. Both X, Z will be considered explanatory variables and prices like Δ or log(P_L) will be included in Z. Various researchers (e.g. Zuehlke 1987, Haurin 1988, Larsen and Park 1989, Yang and Yavas 1995, Ong and Koh 2000, Gensove and Mayer 2001, Anglin et al. 2003 or Li 2004) have included different variables X and Z in specifying Λ. In this study, the proportional hazard assumption is presumed, as Cox (1972) finds that under such assumption, one can actually use a partial likelihood method to estimate the coefficients B and C in (7) without knowing the baseline hazard function.

In the Cox model, if the coefficient of a variable is positive, then an increase in the value of the variable would tend to make TOM longer; otherwise, an increase in the value of the variable would tend to make TOM shorter.

4 Sample Data
The samples were collected on a cross-sectional basis, including their initial asking prices and eventual sale prices, from January 2003 to June 2006. This was a period when Hong Kong had gradually been recovering from the lasting impact of the Asian Financial Crisis in the late 1990s, only to be temporarily hit again due to the SARS epidemic. The number of properties with negative equity reached a historic high of 106,000 by the end of the 2nd quarter of year 2003 (Fig. 1) and unemployment rate was higher than 8% (Fig. 2). Afterwards, the economy had been improving gradually, and thus the price trend and number of transactions of real properties (Table 2). Unemployment rate had continued to fall and interest rate had started climbing in 2005 due to higher demand for mortgage loans, as reflected by the increase in property transactions in 2004 and 2005.
Besides, unlike many western countries, Hong Kong has arguably the largest public housing system in the world, along with Singapore. Yet, as a response to the controversies surrounding the government’s assistance homeownership (HOS) especially during the economic downturn, the Housing Authority (HA) had ceased the construction and sale of HOS flats since 2003. This policy change in some ways has helped accelerate the recovery of Hong Kong’s property market.

![Fig. 1: Number of Residential Negative Equity Cases (Source: Hong Kong Monetary Authority)](image-url)
Fig. 2: Hong Kong's Unemployment Rate and Best Lending Rate (Sources: Census & Statistics Department and HSBC)

<table>
<thead>
<tr>
<th>Year</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Sale and Purchase Agreements for Residential Properties</td>
<td>71,576</td>
<td>100,630</td>
<td>103,362</td>
<td>82,472</td>
</tr>
<tr>
<td>No. of New Completions of Residential Flats</td>
<td>26,397</td>
<td>26,036</td>
<td>17,321</td>
<td>16,579</td>
</tr>
</tbody>
</table>

Table 2: Numbers of Sale and Purchase Agreements for Residential Properties and New Completions of Residential Flats (Source: Rating and Valuation Department)

The data set of the study covers residential sales only. Completed transactions from the initial listing price to the sale agreement, including individual marketing time in elapse calendar days, were included in the data set for empirical study. The transactions cover pre-sale units (units under construction), owner-occupied units, renter-occupied units and vacant-in-possession units. The data refer to domestic flats randomly selected from 168 development estates and individual buildings of various flat sizes from less than 272 sq. ft. to over 3,882 sq. ft. A total of 62, 43 and 63 estate blocks
and individual buildings in Hong Kong Island, Kowloon, and the New Territories, are covered, respectively. There are 4,010 domestic flat sales records of properties listed as early as January of 2003 and sold as late as June of 2006; and for this study, these records are to be separated in four sub-periods (2003, 2004, 2005, and 2006) by their transaction dates in order for us to know how changing economic conditions over time play a role in the determination of TOM.

It should be noted that the data used for this study, unlike many similar studies on Hong Kong’s property market, is not from an official source. The reason is that official data such as the EPRC, based on the trading records from the Land Registry of the HKSAR, does not necessarily provide information such as a flat’s orientation and its current tenure status due to legal concerns. The dataset used for this study, obtained from Midland Realty\(^1\) of Midland Holding Limited, one of the largest property agencies in Hong Kong, allows us to investigate the possible impacts of aforesaid attributes on property price and TOM, which is something that might not be done via the use of government documentations. This dataset is systematic and reliable, and generally regarded as a suitable reference for studying Hong Kong’s property market.

Before further discussions, some summary statistics with regard to the tenure status, price levels and the distribution of TOM are presented in Tables 3 & 4 below.

Table 3 – Summary Statistics (Note: * excluding cases with missing values)

<table>
<thead>
<tr>
<th>Tenures</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
</tr>
<tr>
<td>Pre-sale</td>
<td>150</td>
</tr>
<tr>
<td>Vacant in Possession</td>
<td>2037</td>
</tr>
<tr>
<td>Renter-occupied</td>
<td>323</td>
</tr>
<tr>
<td>Owner-occupied</td>
<td>1493</td>
</tr>
</tbody>
</table>

\(^{1}\) Being a listed company in Hong Kong, as at January 31, 2007, Midland had 426 branches in Hong Kong, mainland China and Macau. Its transactions cover all real properties across Hong Kong amounting to over one-third of the market share in terms of transaction value.
It should be noted that about half (51.0%) of the transacted properties are vacant. Statistics also show that about 40% of them are in the low end of the market (the most common flat type in Hong Kong) with a list price below HK$2 million.

Table 4 – Distribution of Marketing Time (TOM)

<table>
<thead>
<tr>
<th>No. of days</th>
<th>1st Qtr</th>
<th>2nd Qtr</th>
<th>3rd Qtr</th>
<th>4th Qtr</th>
<th>2nd year</th>
<th>3rd year</th>
<th>After 3rd year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>2175</td>
<td>820</td>
<td>461</td>
<td>244</td>
<td>731</td>
<td>1096</td>
<td>1141</td>
<td>4010</td>
</tr>
<tr>
<td>%</td>
<td>54.2</td>
<td>20.4</td>
<td>11.5</td>
<td>6.1</td>
<td>6.9</td>
<td>0.8</td>
<td>0.03</td>
<td>100</td>
</tr>
</tbody>
</table>

A closer look at the marketing periods of individual properties in years and further broken down in quarters of the first year provides some insight to the speed of sales. Table 4 shows the overall distribution of TOM. Slightly over half (54.16%) of the properties were transacted within 3 months after they had been put on sale, followed by 20.47% within the second quarter. In other words, about three-quarters (74.63%) were transacted in half year’s time. Only about 8% were sold over one year’s time. In short, overall sales were effected relatively quickly – despite there is a wide range of TOM from 1 day to 1,141 days.

5 Results and Findings

Stage 1: Hedonic Pricing regression model

Results of the hedonic regression (13) using the full sample are shown in Table 5. It should be noted
that statistically insignificant variables have already been removed through a stepwise selection process in the regression model, and only those with 10% significance or less are included. As shown in the table below, four tenure variables (RENTER, OWNER, PRESALE, UNKNOWNTEN), a number of orientations (NE, NW, SE, and W), two location variables (NT and KLN), and other property attributes (lnSIZE, POOL, DINING, SPACES, CLUBHOUSE and BEDROOMS) are significant at least at 10% level. In regards to flat location, those located on Hong Kong Island are more costly than others in Kowloon (KLN) and the New Territories (NT), primarily due to its better accessibility to the Central Business District. Moreover, the correlation between transaction price and the RENTER variable is the highest among the four significant variables, which points to a relatively higher transaction price for a renter-occupied flat than for others that have identical attributes. The reason is that it generates a higher level of transaction cost for the owner (mostly in terms of time) in order to release the flat from the current leasing contract. In terms of the impact of property attributes on transaction prices, the hedonic model suggests that the presence of swimming pool (POOL) inside a housing estate produces the most positive effect on flat prices, followed by clubhouse (CLUBHOUSE) and carpark spaces (SPACES). Also, the negative relationship between both DINING/BEDROOMS and transaction price suggests, albeit indirectly, that the size of the rooms play a role in the final transaction price. Lastly, condominiums with living rooms facing Northwest, Southeast, West and Northeast have positive correlations with their resultant transaction prices. Overall speaking, the selected housing attributes and economic variables explain for 90% of the variations of the nominal sale price (in natural log).

Table 5 – Hedonic regression of log discounted sale price ln(P₅) (N=3998, excluding cases with missing values; Adjusted R-square=0.900)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>Std. Dev.</th>
<th>t-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>5.472***</td>
<td>.112</td>
<td>48.765</td>
<td>.000</td>
</tr>
<tr>
<td>lnSIZE</td>
<td>1.487***</td>
<td>.020</td>
<td>73.542</td>
<td>.000</td>
</tr>
<tr>
<td>KLN</td>
<td>-.154***</td>
<td>.013</td>
<td>-11.549</td>
<td>.000</td>
</tr>
<tr>
<td>Variables</td>
<td>2006</td>
<td>S.E.</td>
<td>2005</td>
<td>S.E.</td>
</tr>
<tr>
<td>---------------</td>
<td>---------</td>
<td>------</td>
<td>---------</td>
<td>------</td>
</tr>
<tr>
<td>A</td>
<td>2.995***</td>
<td>.266</td>
<td>1.863***</td>
<td>.146</td>
</tr>
<tr>
<td>Δ²</td>
<td>-1.876***</td>
<td>.497</td>
<td>-1.003***</td>
<td>.296</td>
</tr>
<tr>
<td>ESP</td>
<td>1.676</td>
<td>.170</td>
<td>.595</td>
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<td>.507***</td>
<td>.185</td>
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</table>

Stage 2: Estimation of TOM with Cox survival model
Table 6: The Cox Model results for both sub-period samples and pooled samples.

\[
\begin{array}{|c|c|c|c|c|c|c|c|c|}
\hline
\text{Variable} & \text{Coefficient} & \text{SE} & p-value & \text{Coefficient} & \text{SE} & p-value & \text{Coefficient} & \text{SE} & p-value \\
\hline
\text{OWNER} & 1.194*** & .443 & .553*** & .203 & -.364** & .142 & -.571** & .267 & -.099 & .100 \\
\text{RENTER} & 1.411*** & .419 & .469** & .187 & -.466*** & .120 & -.114 & .222 & -.088 & .088 \\
\text{FLOOR} & -.007** & .003 & -.006*** & .002 & .005* & .002 & .006* & .004 & .000 & .001 \\
\text{SPACES} & -.274*** & .139 & .083 & .096 & .056 & .094 & .038 & .136 & .007 & .055 \\
\text{BEDROOMS} & .008 & .085 & -.030 & .058 & .024 & .058 & .094 & .082 & .017 & .033 \\
\text{CLUBHOUSE} & .076 & .132 & .037 & .090 & -.026 & .087 & -.103 & .111 & .001 & .050 \\
\text{POOL} & .011 & .138 & .026 & .093 & .065 & .094 & -.048 & .118 & -.017 & .053 \\
\text{RPPI} & -.129*** & .017 & -.031*** & .011 & .131*** & .011 & -.088*** & .014 & .007 & .006 \\
\text{UNEMPLOYCH} & 2.150*** & .313 & -4.665*** & .267 & 1.607*** & .209 & -.044 & .228 & -1.85 & .131 \\
\text{YEAR2003} & \text{N.A.} & & & & & & & & & \\
\text{YEAR2004} & \text{N.A.} & & & & & & & & & \\
\text{YEAR2005} & \text{N.A.} & & & & & & & & & \\
\hline
\end{array}
\]

5.1 Sub-period analyses vs. Pooled analysis
As suggested in Leung et al. (2002), variables that are statistically significant in the pooled regression are no longer so once the samples are analyzed by sub-periods (semi-annually in their paper). Interestingly, the findings obtained from the Cox Survival Model depict a scenario completely different from that in Leung et al. (2002). Our results indicate that a number of housing characteristics as well as macroeconomic factors are significant at least at 10% (for more detailed discussions in latter sections) in yearly sub-period analyses (Table 6). Nonetheless, these characteristics and economic factors are no longer significant when the sample is analyzed as a whole (pooled). Only the above-market price, the locational variable KLN and the three YEAR dummy variables are significant at 10% level.

5.2 Effect of prices
Here the above-market price, the expected sale price ESP = E(ln(Ps)) and their respective square-terms are included in Z as explanatory variables. Since ESP is highly correlated with ln(SIZE), the latter is removed from Z. Table 6 gives parameter estimates for the Cox model. As one can see, the
above-market price $\Delta/\Delta^2$ are significant at 1% level within all four sub-periods, indicating that overpricing does have noticeable impact on the time-on-market for a residential property. Nonetheless, the impact of overpricing on TOM has changed from negative (in 2003 and 2004) to positive (in 2005 and 2006). Yet, the expected sale price (in natural log) and its square-term are found to be insignificant.

It can be said that during the years when the economy had not been performing well, particularly in 2003 with the breakout of the SARS epidemic, properties with a higher level of overpricing were able to be transacted sooner than others. Considering the amount of properties with negative equities in the first two periods, the availability of flats in the secondary property market had been limited to the point where it was more costly for potential buyers, whether in gathering information and time incurred in searching, to obtain better bargains. As a result, it is easier for sellers to reap profits from setting a higher list price over the relatively low market price. Then, by the time when the economy started recovering in the last two sub-periods, more flats were listed for sale as the number of negative equity flats drastically decreased (Table 2). Information of better deals was easier to obtain, thus reducing the searching cost involved for potential buyers. That said, with a higher number of alternatives at better price on the market, as well as the increasing interest cost, these potential buyers had become more sensitive to overpricing which lengthened the time-on-market for sellers whom adopted such pricing strategies. In summary, the effects of overpricing on TOM change over time, upon the supply of alternatives on the market and the subsequent searching cost incurred for potential buyers.

5.3 Geographical location
Geographical location of the housing unit is shown be significant only in 2003, which suggests that condominiums in Kowloon and the New Territories on average took less time to sell than properties in Hong Kong Island. This is somewhat contrasting the result of Ong and Koh (2000), who find that
housing units near the central business district tend to have shorter TOMs.

5.4 Orientation
It is illustrated that the orientation of a residential flat does not have very significant impact on TOM, aside from the NW variable in 2003 (negative), W/NE/NW variables in 2005 (all positive) and the N variable in 2006 (positive), all with SW being the control variable. The findings are slightly different from that in Li (2004). An underlying reason is that the listed price of flats with relatively inferior orientations (e.g. less popular ones such as those facing north and west) have been already adjusted accordingly in response to the demand.

5.5 Tenure
Zuehlke (1987) shows that TOM can be influenced by the vacancy of a housing unit. In this study, we further examine how TOM would be affected by other kinds of occupancies. With the exception of year 2003, all three tenures (in vacancy, owner-occupied and renter-occupied) are significant at 1% level; similar to the effects of the degree of overpricing, their coefficients were negative in the first two periods and yet positive in the last two. This suggests that pre-sold residential units (the control variable) on average have the longest TOMs in years 2003 and 2004, while having the shortest TOMs in the next two periods. Meanwhile, the impact of owner-occupied, renter-occupied, and vacant flats are very close. The findings on pre-sold flats can be explained through the amount of newly-constructed flats during the study period. More than 25,000 new units were constructed in 2003 and 2004 each, even though the economy had been badly hurt after the SARS attack. Facing direct competition from pre-sale flats, homeowners tended to close deals faster in order to make transactions possible. In the next two years, when the economy had gradually recovered, the demand for housing escalated and so did the supply as the cases of properties with negative equities greatly reduced in 2005. Yet, competitions from pre-sale flats had dropped due to the fall in new completions of flats to around 17,000 units in both 2005 and 2006 (Table 2). Under this circumstance, sellers would look for the best selling price possible in order to obtain the highest return from
transactions. Because of such, pre-sale flats, by default, would have the lowest time-on-market.

5.6 Other housing attributes
Similar to the findings in Ong and Koh (2000), floor levels of condominiums do have significant impacts on TOM. Interestingly, their respective impacts are the exact opposite of that for Δ and the tenure variables. That is, positively significant in 2003 and 2004, and negatively significant in 2005 and 2006. In other words, in the first two sub-periods, residential properties at higher levels of a building were sold relatively slower than those at lower levels, but faster within the next two years. Another factor that has significant impact on TOM is the amount of carpark space, but only negatively in 2006. Except these two, the other selected housing attributes are shown to have no significant effect on TOM. It should be noted that the insignificance of the number of bedrooms on TOM is in line with the findings in Anglin et al. (2003).

5.7 Macroeconomic variables
Changes in unemployment rate (UNEMPLOYCH) has first shown a significantly positive relationship with TOM in 2004, then negative in 2005, and back to positive in 2006. In general, an increase in unemployment rate, reflecting worse economic conditions, tend to lengthen TOM, as potential buyers would become a lot more cautious when it comes to costly decisions such as home purchases. Yet in 2005, a negative impact between the change in unemployment rate and TOM is found. It was the time when the unemployment situation had been gradually improving (see Fig. 2). Even though the economy was recovering, homeowners were expecting even better economic conditions in the future. This insinuates better price (and better return) for their flats. In other words, the noticeably longer TOM recorded under an improving economy in 2005 is due to the expectation from sellers for better returns in the near future.

With regard to the correlation between TOM and general property price trend (RPPI), the impact of
RRPI on TOM is significantly negative in 2003, 2005 and 2006, but significantly positive in 2004. The reason is that, with the expectation of an even higher price for properties in the near future, as reflected in RPPI, a buyer will purchase a property of his/her choosing as soon as possible although the list price may be higher than the buyer’s expected market price. This constitutes faster transactions and generally a lower TOM. The positive correlation between TOM and RPPI in 2004 can be attributed to a much larger supply of second-hand properties on the market. The amount of negative equity cases had rapidly attenuated from more than 100,000 cases in 2003 to only 19,000 cases by the end of 2004 (Fig. 1), indicating that sellers were more willing to put their flats on the market for sale. Meanwhile, new completions of flats in 2003 and 2004 were more or less identical (Table 2). Because of these factors, the search cost incurred for buyers to look for better bargains had significantly reduced. Conditioned by which, a longer TOM arises as sellers are facing more competitions for offers.

6 Conclusion

This study has examined how a variety of housing attributes or market conditions can affect time on the market (TOM). In particular, it examines the trade-off between TOM and the above-market price for a seller. Different from previous studies, the above-market price is measured by the difference between list price and expected sale price, which the latter is regressed through a hedonic pricing model. Our study covers about 4,000 transactions of domestic units on the Hong Kong property market under different living tenures, flat sizes, price ranges, and other physical characteristics. The duration of a listed property on the market is important because it represents the liquidity of real assets as well as the respective trade-offs of buyers and sellers.

The empirical results show that TOM has significant relations with factors such as above-market
price, changes in unemployment rate, general property price trend (RPPI), and an apartment’s tenure status. Nonetheless, it only applies to the yearly sub-period investigations. Of those variables, the significance of overpricing (or the above-market price) on TOM is in line with many previous studies (see Miller, 1978; Ong and Koh, 2000; Anglin and Wiebe, 2004; Li, 2004 and Merlo and Ortalo-Magne, 2004). Nonetheless, a very different result from these studies is found here on how above-market price affects TOM through sub-period investigations. Overpricing strategies could be very effective in some periods of time (2003 and 2004) but not in others (2005 and 2006). For 2003 and 2004, it can be attributed the much limited availability of flats in the secondary property market which made searching for better bargains more costly for potential buyers. Conditioned by this, it was easier for sellers to reap profits from setting a higher list price over the relatively low market price. For 2005 and 2006, as more flats were listed for sale due to much fewer negative equity flats in Hong Kong, searching cost for buyers attenuated as information of better deals was easier to obtain. They had become more sensitive to overpriced properties which in turn lengthened the time-on-market for sellers.

This finding extends the existing literature in two different ways. Firstly, as a response to Asabere et al. (1993), whether to overprice or underprice a property mainly lies in the market/economic situations of a specific period as well as the supply/availability of alternatives on the housing market. And secondly, slightly different from previous studies (such as Anglin et al., 2003; Kalra and Chan, 1994; Yang and Yavas, 1995a; Haurin, 1988) which conclude that TOM itself is influenced by local and national economic conditions, such conditions play an indirect role as they decide the effects of overpricing/underpricing on TOM. Similar situations have also been discovered on the effects of variables, such as RPPI, FLOOR, RENTER, OWNER, VACANT, on TOM. Particularly, the changes in the impacts of the FLOOR overtime depict a different scenario to that in Ong and Koh (2000), in which a negative-only relationship between TOM and FLOOR was found.
In addition, expected sale price (with the exception of 2003) does not have a significant relationship with TOM, which is not in line with some of the studies in the literature (for instance, Trippi, 1977; Miller, 1978; Asabere and Huffman, 1993; Cubbins, 1974). However, the significance of RPPI on TOM indicates that the expectation of an even higher price for properties in the near future causes a buyer to purchase a property of his/her choosing as soon as possible, even at a price higher than the buyer’s expected market price. This constitutes faster transactions or a lower TOM. Then, when there was a much larger supply of second-hand properties on the market in 2004, the searching cost incurred for buyers to look for better bargains had significantly reduced. Competitions for better offers result in longer TOMs for sellers.

Notes
1. The conditions included in market value definitions of the Uniform Standards of Professional Appraisal Practice (USPAP) in the US generally fall into three categories. One of them is: the conditions of sale (e.g., exposure in a competitive market for a reasonable time prior to sale). (Definitions: USPAP 2005.) Secondly, one of the conditions included in open market value definitions of the Royal Institution of Chartered Surveyors (RICS) Red Book 5th edition in the
UK assumes that, prior to the date of valuation there had been a reasonable period (having regard to the nature of the property and the state of the market).

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References


Rating and Valuation Department (various years). *The Property Review* (various issues), Rating and Valuation Department, the Government of Hong Kong Special Administrative Region, PR China.