Factors Affecting Private Domestic Rental Prices in Hong Kong: Example of the Land Auction

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Abstract. Most of the previous researchers estimated the influencing factors of the rising private domestic rental prices in Hong Kong without considering the impact of the land auction. By using the intermediaries of housing prices and property market yields, this paper contributes to evaluating how land auctions affect the private domestic rental costs in Hong Kong. As one of Hong Kong's most important methods for land resource allocation, the land auction has been an excellent example to study the housing market. Based on the random-effects models, the results indicate that housing prices and property market yield significantly positively affect rental prices. The results also suggest that the influences vary among different house sizes. Therefore, this research supports that under the influence of overbidding, the land auction has a positive overall effect on the Hong Kong rental prices.

Keywords: Rental Prices, Land Auction, OLS Model, HongKong.

1. Introduction

There were two main historical events for the emergence of the Hong Kong land auction. The first was the return of Hong Kong to China on July 1st, 1997, and the second was the 1997 Asian Financial Crisis. These two events have significantly impacted the Hong Kong land market. A lot of the prices of land decreased vastly. So to solve this series of problems, the Hong Kong government changed the way of selling the land from "direct sale of land" to "auction." In the auction, land buyers will have more probability of buying the land at affordable prices. This approach allowed the Hong Kong land market to recover to some extent.

The rental market is also an indispensable part of the property market in Hong Kong where population density ranks one of the highest worldwide. According to Hong Kong SAR Government Planning Department, there is merely 1,114 square kilometers of developable land with only 25.1% already exploited[1], causing a severe shortage in real estate, which continuously pushes up housing prices. As a result, local young households or those floating population tend to rent rather than buy a house or department. However, due to the manifest aging tendency and the prevalence of Covid 19, Hong Kong has witnessed a downward trend in population in the recent two years. Also, in October 2021, the Chief Executive of Hong Kong SAR announced a development plan in northern-part-of Hong Kong, but it can still be ensured. The rental market will remain crucial for the foreseeable several years.

Therefore, it is valuable and necessary to study the correlation between land auctions and rental prices. According to former research, a positive relationship between land auctions and housing prices has been stated. Also, some investigated what effects will be brought about by housing price variation in the rental market, but there is little research on how the land auction would act upon rental price. Thus, our paper employs an OLS regression model to investigate their relationship.

Our inspiration arises from the preceding study a whole lot. Generally, there are many papers studying the impact of land auctions on housing prices. By analyzing discontinuous time series and exploring the cross-sectional events, Chau et al. demonstrated that lower than anticipated auction price has a substantial negative impact on real estate prices while higher expectation's influence is limited. [1] Besides, Chang and Dasgupta studied the toehold effect in Hong Kong land auctions by analyzing 201 different land auctions and employing a regression model. They detected the ubiquity of rational overbidding by which the market stock price would be pushed up for their existing pre-sale or ongoing projects in the same area to sell regardless of whether winning the auction or not. [2]

Apart from that, many factors affecting rental prices have been uncovered. Sommer et al. Investigated the impact of the reduced interest rates and relaxed down payment requirements on rental prices in America using a two-stage model and SMM. The results unveiled that changes in these two indicators showed nearly no effect on the rental market. [3] Li and Yao established a life cycle model to study the impacts of changes in house price on household consumption and welfare and found renters and young households can be worse off if the house price appreciated because an increase in current house value can not offset increasingly higher future. [4] Using a hedonic print model, Leung and Yiu discovered that Hong Kong has seen a prevail of sub-divided units (SDUs) for which consumers emphasize the importance of basic housing facilities and other environmental attributes when renting, and they have to pay a higher rent for accessibility of these things. Besides, as subdivision density increases, the rent decreases. [5]

Additionally, employing a two-stage least square (2SLS), Yaoxuan Huang investigated the effects of housing attributes and environmental variables on housing rental prices in Hong Kong. The results from their study have shown that the size of the sub-divided units, accessibility to community facilities and parks, vicinity to primary school, and distance to MTR stations are the major concerns for tenants. [6] Regarding the causal relationships between residential property prices and rentals, YAN-LEUNG CHEUNG demonstrates that price changes lead to rental rate changes by applying quarterly data of sale prices and rental rates for the five categories of residential property in Hong Kong. [7]

In another investigation of the sensitivity of urban housing demand to the income changes, by using four waves of Hong Kong census data between 1996 and 2011, based on the permanent income model Xian Zheng et al. stated that while the higher tier of households is more sensitive to transitory income shocks, households in both the lower and upper tiers are more sensitive to permanent income changes. [8-10]

Since the land auction would contribute to a growth in both housing prices and property market yields, at the same time, the housing price and property market yields are expected to have a positive relationship with the rental prices. This paper will further explore how the land auction affects private domestic rental prices by influencing housing prices and property market yields. So, in the following article, the panel data of Hong Kong from 2012 to 2021 is used to examine the joint effect of housing prices and property market yields on the rental prices based on different house sizes.

2. Data and methods

2.1. Data and variables

Our primary data source is from the Rating and Valuation Department of Hong Kong. We decided to use the private domestic rental indices by class as an indicator to measure the private domestic rental prices in Hong Kong, which directly represents the change in the private domestic rental prices by class territory-wide. We also generated private domestic price indices and private domestic market yields by classes as our main explanatory variables. The former represents the change in the private domestic housing prices, while the latter reflects the private property market investment income in Hong Kong. Since the government data has divided the private residence in Hong Kong into five categories based on the house size, we generated the corresponding panel data while the classification results are shown in Table 1. Data for our control variables are collected from the China Premium Database (CEIC Data), including the real GDP, unemployment rate, total loans, and government expenditure in Hong Kong, which are expected to impact rental prices. All variables are in quarterly increments from 2012 to 2021.

Table 1. Alphabet and House Size correspondence table

	House Size
A	Less than 40 m^2
B	40 m^2 to 69.9 m^2
C	70 m^2 to 99.9 m^2
D	100 m^2 to 159.9 m^2
E	160 m^2 or above

2.2. Methods and Models

We exploit the fact that the differences in house size from A to E will cause a different response of the rents to changes in property prices and markets yields. Therefore, we conducted six regressions with different data. First, for the panel data of the five classes, while the other five times are for single classes A to E. As a result, the OLS estimation specification is as follows:

$$Y_{i,t} = \beta_0 + \beta_1 PMY_{i,t} + \beta_2 HP_{i,t} + \beta_3 GDP_t + \beta_4 UR_t + \beta_5 TL_t + \beta_6 GE_t + \varepsilon_{i,t} \quad (1)$$

Where $Y_{i,t}$ is the private domestic rental indices for class i in quarter t. $PMY_{i,t}$ is the private domestic market yields for class i in quarter t. $HP_{i,t}$ is the private domestic price indices for class i in quarter t. GDP_t is the Real GDP in quarter t. UR_t is the unemployment rate in quarter t. TL_t is the total loans in quarter t. GE_t is the government expenditure in quarter t. ϵ_{it} is the error term. Using the xttest2 and xttest3, we found that cross-sectional correlation and heteroscedasticity problems exist in panel data. Furthermore, based on the result of Hausman test, we conducted a robustness test by the random-effects models.

3. Empirical results

3.1. Main results

The primary estimations results of this paper are presented in Table 2 to Table 7. The first table is generated from the panel data of five classes. The PMY and HP coefficients are significant at the 0.001 level, indicating that the impact on the rental price brought by the change in property market yields and housing price are significantly positive. The GDP coefficient is significant at the 0.01 level, indicating that the impact on the rental price caused by the change in real GDP is a significant negative. The coefficients of the unemployment rate and total loans are significant at the 0.001 level, which means the impact of the unemployment rate is significantly negative, while the impact of total loans is significantly positive. The coefficient of government expenditure is also significant, but it has infinite convergence to zero, so the government expenditure is estimated to have almost no impact on the rental price.

In the remaining five tables, the HP coefficient is significant at the 0.001 level, indicating that the impact on the rental price generated by housing price change is significantly positive for all five house sizes. The PMY coefficient is only significant for classes C and E, but not significant for other classes, suggesting the effect induced by the change of property market yields is merely significant positive for houses in C and E classes. The GDP and TL coefficients become not significant when regressing the five classes independently for all of them. The GE coefficient is only significant for the E class, but the value is still approximately equal to zero. Moreover, the UR coefficient is still significantly negative in the five regressions.

Table 2. Regression results (Overall)

	Property Market Yields	Housing Price	Real GDP	Unemployment Rate	Total Loans	Government Expenditures
Rental Price	23.121***	0.378***	-0.236**	-0.774***	0.030***	-0.000**
	(1.8648)	(0.0085)	(0.0772)	(0.2137)	(0.0025)	(0.0000)
N	200	200	40	40	40	40

Table 3. Regression results (A Class)

	Property Market Yields	Housing Price	Real GDP	Unemployment Rate	Total Loans	Government Expenditures
Rental Price	9.713	0.335***	--0.151	-1.768***	0.007	-0.000
	(11.1849)	(0.0448)	(0.2296)	(0.4095)	(0.0524)	(0.0000)
N	40	40	40	40	40	40

Table 4. Regression results (B Class)

	Property Market Yields	Housing Price	Real GDP	Unemployment Rate	Total Loans	Government Expenditures
Rental Price	9.882	0.339***	-0.129	-1.258**	0.021	-0.000
	(15.5615)	(0.0631)	(0.1838)	(0.3325)	(0.0329)	(0.0000)
N	40	40	40	40	40	40

Table 5. Regression results (C Class)

	Property Market Yields	Housing Price	Real GDP	Unemployment Rate	Total Loans	Government Expenditures
Rental Price	40.671**	0.421***	-0.168	-0.623**	0.046	-0.000
	(11.1088)	(0.0518)	(0.1070)	(0.2144)	(0.0349)	(0.0000)
N	40	40	40	40	40	40

Table 6. Regression results (D Class)

	Property Market Yields	Housing Price	Real GDP	Unemployment Rate	Total Loans	Government Expenditures
Rental Price	23.890	0.291***	-0.091	-0.812**	0.001	-0.000
	(12.6369)	(0.0472)	(0.1238)	(0.1897)	(0.0292)	(0.0000)
N	40	40	40	40	40	40

Table 7. Regression results (E Class)

	Property Market Yields	Housing Price	Real GDP	Unemployment Rate	Total Loans	Government Expenditures
Rental Price	18.129**	0.126***	-0.108	-0.821***	-0.007	-0.000*
	(5.0244)	(0.0294)	(0.0813)	(0.1228)	(0.0250)	(0.0000)
N	40	40	40	40	40	40

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4. Discussion

4.1. General impacts of Land Auction

The findings show that the overall Rental Price is positively correlated with increasing Housing Price, which is the predominant parameter of interest. When house prices rise, rents are likely to rise as well, provided that the rent to sales ratio remains relatively stable. The first reason is that in the new world of " rent to sell" if house prices were to remain stable, rental returns would need to rise to an average level in order to allow buyers to leave speculation and hold on to their homes for the long term. This is the state's way of regulating the housing market. Secondly, many companies are also trying to raise rental prices to achieve high business revenues. More than anything else, the reason for this is that if house prices rise, people tend to choose to rent as an alternative because they are limited by the financial ability to buy. In such a situation, the rental market is more popular. After all, the price of renting is still more affordable than buying. As a result, the rental price is increased in order to get a higher profit.

According to table 2, the results significantly indicate that the effect of Property Market Yields on Rental Price is the most significantly correlated. According to toehold-related literature, the Government in Hong Kong makes extensive use of auctions to dispose of land to owners. An important 'foothold effect' is associated with these auctions, as the ongoing development has already been developed in the geographical area of the same auction. If the toe price of the auction is high, this may facilitate the developer selling new flats in ongoing development at a better value. Auction theory forecasts that the higher toe will be linked to both more vigorous bidding and a more substantial likelihood of winning. Therefore this has indirectly led to a consequent more significant impact of Property Market Yields on Rental Prices.

4.2. Importance of other Explanatory Variables

Examining only a single explanatory variable is insufficient to test the dependent variable’s overall effect. Moreover, a single variable is not realistic because in reality, one can not thoroughly remove whether other factors are more critical elements or confounding ones. Furthermore, in this study, the effect of house price alone on rental prices can go on forever, in which case rental prices will keep increasing as long as house prices increase, which is impossible and unlikely. So we need to balance house prices and rental prices under the combined influence of multiple variables, so that people are not unable to afford to buy or rent, thus making society stable. Under the influence of Real GDP and the Unemployment Rate, it shows a relatively stable trend overall. However, it is surprising that Government Expenditures are not significantly correlated with Rental Price, contrary to our suspicions.

4.3. Impact analysis of Government Expenditure

Surprisingly Government Expenditures did not significantly correlate with Rental Prices, which is not what we had suspected. After reading a bit of literature, it was likely that this was related to the epidemic. As a customary practice, July and August is the high point of the rental market in Hong Kong, as millions of university students graduate during this period, and a lot of them hope they can find a desirable job in Hong Kong, which directly pushes up the rental prices in Hong Kong. However, due to the COVID-19, most university students spend the second half of the year at home and many graduates do not come out to look for jobs, and even if they try to, many companies have simply canceled their recruitment drives due to the epidemic. At the same time, there has been an increase in the number of unemployed people who rent low-cost housing, which has left this group disconnected from the real estate market, thus resulting in Government Expenditures having little effect on the rental market.

4.4. Variance among different Housing Classes

By comparing the different house sizes, Class B has the most significant impact on houses ranging in size from 40 m^2 to 69.9 m^2. The same is valid for class D with the house size between 100 m^2 and 159.9 m^2. For the B class, it is suitable for a single room, so its room size can be used by a wide range of people, such as bachelors and those working abroad. Therefore, when the rental price increases, some groups may choose other types of flats. For example, those with less money may take a step back and choose A class, while those with more funds are willing to spend more money to rent C class, so as to obtain more comfortable living conditions.

The D class rooms are more prominent, but not the largest, and are of a medium standard, suitable for a family or a shared room, which is still relatively expensive, and so as the price increases, some people, such as those sharing a rent, will choose a smaller room which is cheaper and does not affect their basic requirements. However, when the price decreases, there will be a significant number of people who will choose the D class rather than the C class.

Conversely, the E class is a less influential class of household. This is most likely since this type of house is considered to be a luxury house, and its price is the most expensive of all, therefore its price floor does not fluctuate greatly, thus those who can afford to rent can still afford to rent, and those who cannot afford to rent still cannot afford it. Meanwhile, those who can afford this type of property generally prefer to buy rather than rent. So price fluctuations are not significant for this type of property.

5. Conclusion

The overbidding effect in land auctions can increase the land prices in Hong Kong, which makes the holders able to sell the assets at higher prices, leading to an increase in the private housing price and property market yields. The results indicate that the rising housing price and property market yields can lead to positive rental growth. So the land auction in Hong Kong is expected to cause higher rental prices by generating the “toe hold” effect.

However, the contribution of property market yields to rental price is more significant for houses with a size between 70 to 99.9m^2 compared to other house types. It may be caused by the market demand for this kind of middle-sized house in Hong Kong being higher than others, which makes it easier for the holders to gain profits from this house size. The government expenditure unexpectedly has few effects on the rental prices, indicating that the vast majority of expenditures are spent on public houses, which are provided for citizens who cannot afford to rent a house in the market. So the government expenditure almost has no impact on the market rental prices.

The results of this study apply to all regions with the land auction, and also contribute to comprehending the function of the land auctions in influencing the housing market. However, heterogeneous effects should not be neglected in the results. The impact factors differ among various house types. Accordingly, policymakers should generate additional consciousness of adjusting land auctions to cool down the housing rental market. Nevertheless, our results may have potential limitations. Due to the inconsistency of statistical caliber, our data was deficient before 2012, so we only limited the results to 2012-2021. Further research can analyze the long-term effects of this effect.

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