Habitat International 62 (2017) 43–50

Contents lists available at ScienceDirect

Habitat International

journal homepage: www.elsevier.com/locate/habitatint

A study of sub-divided units (SDUs) in Hong Kong rental market

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ARTICLE INFO

Article history:
Received 17 November 2016
Received in revised form
18 January 2017
Accepted 20 February 2017

Keywords:
Sub-divided units (SDUs)
Time-on-the-market(TOM)
Two stage least square (2SLS)
Housing rental price
Hong Kong
Housing market

ABSTRACT

This paper is the first study to investigate the impacts of housing attributes and environmental variables on housing rental price and the-time-on- market (TOM) of sub-divided units (SDUs) in Hong Kong via statistical method. A two stage least square (2SLS) method is introduced in this paper to solve the simultaneous problem of housing rental price and TOM, which overcomes the shortcoming of estimation bias in previous studies. The findings suggest that the size of the SDUs, distance to MTR stations, vicinity to primary school, accessibility to community facilities and park are the major concerns for tenants living in SDUs. These significant results provide valuable information to the urban planners and public housing committee of Hong Kong for a better development of the public housing in the near future.

1. Introduction

Sub-divided units (SDUs), called subdivided flats as well, as the name indicates, are the special housing units in which domestic units are sub-divided into two or more smaller units for rental purposes (CSD, 2016a). SDUs are the derivatives of common type of rental housing in Hong Kong. In general, there are two types of SDUs in the markets, which are classified by physical partitions. The first type of SDUs feature with observable physical partitions. In such type of SDUs, the concrete or wooden walls are usually used to divide the original units or flats into two or more small units, where each unit equips with independent toilet and/or cooking area. The second type of the SDUs is characterized with unobservable physical partitions. The units of this type of SDUs are separated by simple wooden cubicles and facilities with the kitchen and bathroom shared among the tenants. Each of the units is rented out independently and directly from the landlord to the tenant. Living in SDUs may shoulder some potential risk/safety problem as the original non-structural partition walls are removed while the new ones are erected, new toilets and kitchens are installed, and internal drains are added or altered (CSD, 2016a). These works may result in some safety problems provided the partitions are not well-conducted.

Most of the SDUs are inside the old residential buildings, which are mainly distributed in Kowloon with the market share of 58.4% (CSD, 2016a). The number of people living in SDUs rockets from 53,000 in 2007 to 171,300 in 2013, consisting of nearly 2.5% of the population in Hong Kong (Ma, 2014). According to the most recent reports conducted by Hong Kong Government (CSD, 2015; 2016a), people who live in SDUs are mainly low income families, new immigrants, unemployment citizens and single elderly people. One of the major reason that drives the soaring number of people living in SDUs is the lack of supply of public housing of Hong Kong (Fung, 2014). In this regard, people who drop the first application of public housing need to wait for a long time, on average 4.1 years (HKHA, 2016), till the first public housing unit allocation. Another reason may be due to the overwhelming rental price of private estates, where the data provided by the Rating and Valuation Department (RVD, 2016) shows that the rental price sharply rises by almost 50% from 2011 to 2015. However, the average income of Hong Kong only increases by roughly 20% from 2011 to 2015 (CSD, 2016b), which falls behind the steepened trend of rental price of private estates. Therefore, the low-income groups of people have to shift their choices to SDUs in order to meet their housing needs.

In recognition of the serious problem of housing unaffordability in Hong Kong, the Hong Kong Government has initiated a series of measures since 2011 such as supplying more public houses and forming a long term housing strategy steering committee to take good care of the grassroots citizens (Fung, 2014; Ma, 2014). However, the actions and strategy of the Hong Kong government could not provide a full cover for such group of residence living in SDUs.

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http://dx.doi.org/10.1016/j.habitatint.2017.02.008
0197-3975/

Instead, the shortage of affordable housing remains unsolved and gets more severe. According to the most rent report from Hong Kong Government (CSD, 2016a), the median monthly rental payment of SDUs increased by 10.5%, from $3800 in 2014 to $4200 in 2015, while the median household income increased by 6.1% from $11,800 in 2014 to $12,500 in 2015. In other words, the rising trend of rental prices in SDUs is even steeper than that of the salary level.

What drives the rental price of SDUs steeply increase remains unknown yet. To our best knowledge, most of the previous studies or reports focus on description of why and how the SDUs exist in Hong Kong while provide little information of the rent pricing details. Typical conclusion is to criticize the failure of housing policy in Hong Kong and ascribe such phenomenon to the wealth gap. The SDUs market consists a part of the general housing market rather than occasion and therefore deserves further study. Both the dimensions of rental price and time-on-market contribute to unveil the mysterious embedded in SDU market. Two issues are worth our concerning, one of which is the relationship between time-on-the-market (TOM) and rental price of SDUs in the housing markets. The other one is to investigate the impacts of housing attributes and environmental variables on TOM and rental price of SDUs. However, rental price and TOM generate a simultaneous optimization problem and thus make the issue complicated. On one hand, a motivated household can be ready to propose a high rent payment to quickly proceed to the transaction. On the other hand, a patient household waits for a long time in order to catch the low rental price (Dubé and Legros, 2015). Examining the simultaneous problem is not an easy task as both TOM and rental price may raise the endogenous problem in the statistical manner. To our knowledge, very few studies provide a full solution for simultaneous problem in housing market. To fill this knowledge gap, this study intends to provide a solution for a simultaneous rental price and time-on-the-market problem in Hong Kong via a two stage least square (2SLS) approach. The significance of this study would provide valuable information for the urban planner and policy maker.

The structure of paper is organized as follows. After the section of introduction, a literature review of time-on-the-market is in Section 2. Section 3 displays the research method, including research procedures for solving the simultaneous problems via 2SLS approach. Section 4 illustrates the data sample and variable selection. Section 5 discusses the results and findings, while Section 6 draws a conclusion.

2. Literature review

Time-on-the-market (TOM), named as marketing time as well, of the housing transactions has long been investigated by the researchers (Belkin, Hempel, & McIeavey, 1976; Janssen & Jobson, 1980; Kang & Gardner, 1989; Yavas & Yang, 1995; Knight, 2002; Anglin, Rutherford, & Springer, 2003; Cheng et al., 2008; Allen, Rutherford, & Thomson, 2009; Hui & Yu, 2012; Hui, Wong, & Wong, 2012; Dubé and Legros, 2015). The relationship between the housing transaction and the marketing time is carried out following the matching theory or search theory (Knight, 2002; Dubé and Legros, 2015). The home sellers expect to maximize the selling price and minimize the marketing time. At the same time, the buyers are willing to pay for a house by searching the housing market in order to maximize their utility (Knight, 2002). The interaction between the sellers and buyers may generate a reasonable transaction price and marketing time of housing. The sellers would set the ask price (listing price) based on the housing markets, which provide some available sources for the buyers. The buyers would strategically arrive at the desire properties based on the information they acquire. Belkin et al. (1976), Janssen and Jobson (1980) and Kang and Gardner (1989) are the early studies concerning about the relationship between ask price and TOM via OLS method. These research conclude that the TOM would decrease if the ratio of the selling price to listing price increase, which provides good explains of search theory on TOM that the lower (higher) ask price set by the sellers, the higher (lower) arrival rate of the buyers, resulting in a short (long) marketing time of property on the market.

However, studies above could not depict the holistic view of the relationship of housing transactions and TOM. Nearly all of the available sources of the researches regarding the relationship between TOM and transaction price would set one of these two items as the independent variable to explain the other one. For example, the studies of Miller (1978), Sirmans, Turnbull, and Dombrow (1995) consider TOM is the independent variable for explaining housing price. Belkin et al. (1976), Genesove and Mayer (1994), on the other way around, use housing price as the independent variable to explain the TOM. Even though there are some alternative types of researches by considering a group of factors to explain TOM via survival analysis and hazard models (Haurin, McGreal, Adair, Brown, & Webb, 2013; Hui & Yu, 2012; de Wit and van der Klaauw, 2013; Hui et al., 2012; McGreal, Adair, Brown, & Webb, 2009; Zuehlke, 1987; Glower et al., 1998), all the methods are basically linear model of log TOM regressing on a series of factors, equivalent to the work of Belkin et al. (1976) and Genesove and Mayer (1994). A major deficit is that such method neglects the simultaneous endogenous problem of housing price and TOM that these two items are jointly determined by the sellers and buyers.

To solve the endogenous problem, some studies (Asabere & Huffman, 1993; Cubbin, 1974; Ferreira & Sirmans, 1989; Kang & Gardner, 1989; Asabere and Huffman, 1993; McGreal et al., 2009; Yavas & Yang, 1995) come up with the two-stage least square (2SLS) method to consider at least one of the two variables (e.g. TOM and housing sales price). In the studies of Asabere and Huffman (1993) and McGreal et al. (2009), a reduced model that TOM regresses on a group of independent variables is conducted in the first step. The estimated value of TOM is used as the predicted value as the independent variable in the sale price equation in the second step. Another group of studies (Cubbin, 1974; Ferreira & Sirmans, 1989; Kang & Gardner, 1989; Asabere and Huffman, 1993; Yavas & Yang, 1995) reversely estimate the housing price as the predicted value by a set of independent variables in the first step and use the predicted value as independent variable in the second step to study TOM equation. Though the endogenous problems are partly solved, studies above still have obvious shortcomings as only one equation is considered.

To improve the above drawbacks of using 2SLS in empirical analysis, Springer (1996) introduces a model by using part of collected samples of the housing price in the reduced model in order to estimate the predicted value. In the second part of the estimation, the rest of the samples together with the predicted value in the first part are used to investigate TOM. In addition, a new variable documenting the sellers' motivation is also considered. This new variable is measured via the ratio of the difference between the predicted price in the first part of the model and raw data (asking price) to the asking price. Another study conducted by Anglin et al. (2003) tries the similar effort by utilizing the difference of the asking price and the predicted price as the new variable to solve the endogenous problem for housing price in the reduced model. Both of these two studies do some improvements by showing that the asking price is not the endogenous and it well reflects the negotiation process and maybe useful for estimating the final sales price, yet the new variable constructed in their models cannot provide the full solution as the endogenous problem of TOM remains unsolved. Knight (2002) further addresses a new trial by employing each other as independent variables in the