China Economic Review 30 (2014) 180–191

Contents lists available at ScienceDirect

China Economic Review

The nexus between labor wages and property rents in the Greater China area ☆

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ARTICLE INFO

Article history:
Received 21 July 2012
Received in revised form 25 June 2014
Accepted 25 June 2014
Available online 3 July 2014

JEL classification:
J31
R30

Keywords:
Shadow wage
Property rental price
Central business district

ABSTRACT

Tse and Chan (2003) investigated the relationship between property sales price and the value of commuting time without accounting for the fact that property sales price is subject to the inherent limitation of containing speculative elements. A better measure to use for such a study would be the rent paid by the genuine end-user of the property. This paper examines how equilibrium rents in different locations within Greater China are determined by the time value, or the shadow wage, of an individual. Using the rental information, we provide the first estimated ratio of time values for individuals in Hong Kong, Shanghai and Taipei. Our results show that the shadow wage ratio of the households in Hong Kong, Shanghai and Taipei is about 2.25:1:1.61.

1. Introduction

Location is always a definitive factor in determining the price of a property, where the price of properties in different locations hinges upon the perceived value of traveling time between home and the central business district (CBD), ceteris paribus. In particular, property value is negatively related to the distance from the CBD, as predicted in the monocentric city model developed by Alonso (1964), Muth (1969) and Mills (1969).[1] Given the rental differentials across different districts, one should be able to retrieve the time value associated with the commuting time, or the shadow wage, of an individual. This paper builds upon related literature by addressing the nexus between property value and the shadow wage. Both property value and shadow wage have long been studied in the past. For example, Stegman (1969) and Henderson (1977) examined the effect of environmental quality and location accessibility on property price. Nelson (1978), as well as So, Tse, and Ganesan (1997), assessed the effect of transportation on property price. Mahan, Polasky, and Adams (2000) considered the relation of property price to urban air quality and wetlands separately.[2] Heckman

☆ We would like to thank the editor, an anonymous referee, Charles Leung, Travis Ng and Tommy Leung for their helpful comments. We would also like to thank Min Chen for able research assistance. Any remaining errors are ours.

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[1] According to McMillen (2006), although cities are becoming increasingly polycentric, modern urban areas still tend to be dominated by the traditional CBD. The monocentric model still has a predictive value, even though the rate of decline in property values with distance from the CBD has fallen over time.

[2] The hedonic regression method and factor analysis are often applied to estimate the individual factor effect on property price (Bajari & Kahn, 2008; Kain & Quigley, 1970).

http://dx.doi.org/10.1016/j.chieco.2014.06.010
1043-951X/

(1974) examined the observed wage rate of women and the shadow price of time. However, the relation between shadow wage and property rental price has seldom been examined. This paper brings the two issues together to provide a new perspective on recovering the shadow wage from the property rental value in three major cities in Greater China, namely, Hong Kong, Shanghai and Taipei.

The rental value of a property depends mainly on two types of variables.

$$price = f(X, t) \tag{1}$$

where X is a vector representing the characteristics of the property such as its age, size and floor number, and t is the time cost variable reflecting the CBD proximity effect on property. Similar to Tse and Chan (2003), traveling time from a property to the CBD, instead of distance, is used in this paper to measure its effect on property price. The estimated coefficient associated with the variable can be used to derive ratios of time values among different cities. The rest of the paper is organized as follows: Section 2 describes the data and provides the details of the measurement methods. Section 3 introduces the models and methodology used in the empirical research. Section 4 reports the results of different models. Section 5 concludes the paper and suggests directions for future research.

2. Data

The residential property rental markets (referred to as the property rental market hereafter) of the Greater China region, including Hong Kong, Shanghai and Taipei, are examined and compared. Unlike McMillen and Singell (1992), who studied seven cities[3] in America, this paper focuses on three cities in Greater China because (1) they are densely populated; (2) the public transport systems (i.e., the railways and busses) are the primary means of commute, and a precise measurement of commuting time is easily obtainable; (3) the cultural factors of these three Chinese cities are similar.

The CBDs in Hong Kong, Shanghai and Taipei are individually examined in this paper.[4] To limit the complexity of this research, a single leading CBD is selected in each city (Central in Hong Kong, Lujiazui in Shanghai and Xinyi in Taipei) based on the official recognition of the district and consensus among real estate consultants. A concentration of the city's landmark buildings in the selected district serves to further support its leading role as a commercial district.

The property market is composed of the rental market and sales market. Property buyers can be either end-users or investors, while tenants are mostly genuine end-users. Unlike Tse and Chan (2003), who focused on the private property sales market and its prices, this paper only uses information from the private property rental market in order to exclude the influences of speculation in the property market.

Most people in Hong Kong and Shanghai travel to the CBD by public transportation, since private motor vehicle ownership in these two cities is relatively low due to expensive and limited parking spaces in the CBD, high gasoline taxes and import duties on motor vehicles.[5] In Taipei, private vehicle ownership is higher, with one out of four people owning a private car and one out of two people a motorcycle. Nevertheless, average daily ridership on the mass transit railway in all three cities is high.[6] Compared with alternative public transport systems, the railway provides the most accurate and reliable information on commuting time. Properties atop or adjacent to the railway stations are sampled for a precise measure of commuting time, whereas those beyond walking distance from the railway stations are excluded from our study due to measurement difficulties. Since residents in our sample are self-selected to live close to the railway stations, it is reasonable to assume that they do so for easy access to the CBD. Thus, our sample group has a much higher chance of working in the CBD than others who live in less convenient area. This self-selected sample also eliminates the potential bias of people traveling by private vehicle, since people living very close to the railway stations are more likely to use public transport instead of driving.

The information on vector X representing the characteristics of the property (i.e., age, size and floor number) is obtained from the websites of various real estate agencies[7] and the time cost variable or the necessary commuting time is obtained from the websites of the metro systems[8] in the three cities. A total of 1086, 1741 and 893 observations[9] in the property rental markets of Hong Kong,

[3] McMillen and Singell (1992) studied Cleveland, Columbus, Dayton, Detroit, Indianapolis, Philadelphia and Pittsburgh in America.

[4] All the three cities in our sample have a single CBD. Although the Hong Kong government plans to turn Kowloon East into the second CBD, the most important business district will remain in Central (http://www.scmp.com/article/981836/planners-think-big-kowloon-east). In addition, a number of Hong Kong's landmark buildings, such as IFC, are located in Central, while the offices of the Hong Kong Monetary Authority and Hong Kong Exchanges and Clearing Limited are located in Central as well. For Shanghai, according to the website of the Pudong New Area Government, Lujiazui is the only national-level development zone named with finance and trade (http://english.pudong.gov.cn/html/pden/pden_business_dz/Info/Detail_73178.htm). In addition, a number of Shanghai's landmark buildings are located in Lujiazui, such as Shanghai IFC and Jin Mao Tower. The Shanghai Headquarters of the People's Bank of China and the office of the Shanghai Stock Exchange are located in Lujiazui as well. For Taipei, Xinyi will contain at least 50% of the total Grade A office stock in Taipei, and will remain as the leading commercial center of Taipei (http://www.prweb.com/releases/2007/07/prweb542482.htm).

[5] In Hong Kong, there were only 63 private cars licensed per 1000 people in 2012. In Shanghai, there were only 51 private cars owned per 1000 people in 2011 (data sources: *Shanghai Statistical Yearbook 2012*, Hong Kong Transport Department).

[6] Average daily ridership per capita in 2012 was around 0.68, 0.36 and 0.67 in Hong Kong, Shanghai and Taipei respectively (data sources: Hong Kong MTR, Xinmin News, Taipei Rapid Transit Corporation).

[7] For the property rental market in Hong Kong, the data sources are Centaline Property (http://web.centanet.com/findproperty/) and Midland Reality (http://www.midland.com.hk/chi/). For the Shanghai property rental market, the data source is Koofang (http://shanghai.koofang.com/), while for the Taipei property rental market, the data sources are Happyrent (http://happyrent.rakuya.com.tw/) and Twhouses (http://www.twhouses.com.tw/).

[8] The metro systems in Hong Kong, Shanghai and Taipei are Mass Transit Railway, Shanghai Metro and Taipei Rapid Transit System, respectively.

[9] In Shanghai and Taipei, since the property information shown on the real estate websites is not well organized, the information on the property estate is always missing, while only the street name and number of the properties can be found. Therefore, it is not feasible to identify the property estate information on the observations in these two cities. However, the property estate information can be found on the real estate websites in Hong Kong, and the observations in Hong Kong are obtained from 76 property estates.