VALUATION OF COMMERCIAL LAND IN LESS-DEVELOPED CITIES IN CHINA

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Abstract

The urban land tenure in China is known as 'land use rights'. The first auction sale of land use rights for private development in Shenzhen in 1987 led to the revival of the property market in China. The problem with assessing land value in China is the lack of market data. In the absence of market data, it is difficult to determine the prices of land use rights using conventional valuation methods. A lot of land use rights were granted to developers at a price determined arbitrarily by the relevant officials. A benchmark pricing system was subsequently implemented to control the problems and guarantee a reasonable return the government. This pricing system has been implemented in major cities. However, in less developed cities, the pricing system has not been established because of the lack of expertise and resources. This paper suggests an alternative method based on the urban land location theory to assess commercial land value in less developed cities. It is found that this method can give an accurate result comparable to that obtained by the capitalisation method.

Keywords

Land use rights, benchmark pricing system, location theory, location coefficient

Introduction

Valuation of urban land in China is developed alongside the reform of economic system and land use system in the country. The first auction sale of land use rights in Shenzhen in 1987 triggered studies of the problems of land valuation. The amount of urban land valuation is increasing especially after the resolution in the Seventh National People Congress on the "People's Republic of China Constitution Amendment Proposal" and "Regarding amendment of the People's Republic of China State Owned Land Management Act" that allows the legal transfer of land use rights.

At present, the urban land market in China is still in an infant stage. This is especially the case for less developed cities. In these cities, there is little transaction data. Even if some data is available, the market is unregulated and the majority of valuers are inexperienced. The problems are aggravated by the behaviour of certain corrupted officials and the existence of 'invisible' or 'black' land market. The market data, if available, is thus highly unreliable (Chan, 1999). Accordingly, it is difficult to apply conventional valuation methods such as the direct comparison method or capitalisation method for valuation (Yang & Wu, 1997).

To solve the problems, it is suggested to use a valuation approach developed upon the basis of urban land location theory. The method involves to a process to quantify attributes of location, establish finite land transaction sampling points, determine land location coefficients, and assess land value in the transaction data deficient sampling areas. It is found that this method can be used to assess land value with accuracy comparable to the capitalisation method.

Commercial land valuation in major cities

Since the first auction sale of land use rights (LUR) in Shenzhen in 1987, China has re-opened the property market (Chan, 1999). It also faces the problem of valuing urban land at the same time. Apart from land that is allocated administratively to government agencies and state enterprises, all other development land has to be released through the assignment of LUR. The purchaser of LUR has to pay a price based on the land value. In advanced countries, valuation of urban land can be carried out with little problem because market evidence is available. In China, the property market was abolished soon after the communist regime took power. This created a serious deficiency in market evidence. In the absence of market data, it is extremely difficult to assess land value with the

established valuation methods used in advanced countries.

Soon after the implementation of the "Open Door' policy in China, a large number of property development projects was carried out in the country. Development land was obtained through both proper and improper channels. For the proper channel, developers had to purchase LUR from the government. As market data was not available, the prices of LUR were often arbitrarily fixed. For the improper channel, land granted administratively to government agencies or state enterprises was illegally transferred to developers often at a price undercutting the official figure. Since these transactions were not reported, an 'invisible' or 'black' market was created (Chan, 1999). To solve the problem, the central government on the one hand introduced legislation to outlaw unauthorised land transfer, on the other hand it introduced a benchmark pricing system (BPS) to determine urban land value. It is a measure that aims at establishing "land prices in a market where there was virtually no comparison data available" (Walker and Li, 1994).

The objectives of the BPS are to help relevant government departments determine land value and on the other land guarantee a reasonable return to the government. The BPS is based on the urban land location theory and has been implemented in major cities such as Beijing, Shanghai, Tianjin, Guangzhou and Shenzhen, etc. Under this pricing system, urban land is graded according to a number of factors. These include location, degree of prosperity, transportation, municipal facilities and amenities, population density, plot ratio, street frontage and the term of the LUR (Zhou, Chen & Chau, 1992). Regarding commercial land, the determination of the degree of prosperity is quite controversial and has attracted lots of criticism. This factor is mainly based on the profit of the business on the premises. Since business profit is a secret to individual traders, very often the figures reported do not reflect the real situations. The problem is exacerbated by the absence of clear guidelines if the profit should be before tax or after tax. Accordingly, the accuracy of commercial land benchmark prices in the relevant cities is questionable.

Commercial land valuation in less developed cities

In less developed cities in China, commercial land valuation is still largely based on guesswork. The BPS has not been established because of the lack of expertise and resources. Given there are problems with the accurate determination of the degree of prosperity, it is considered that the BPS is not suitable for less developed cities. Instead, the following more simple and reliable approach is suggested.

Methodology

Unlike residential and industrial land that are located in well defined zones, urban commercial land features that it is generally located along major roads. Fisher and Martin (1994) point out that "[since] real estate is immobile, location is a key element affecting an income producing property".

Harvey (1987) points out that by substituting 'general accessibility' for 'transport cost'; the Von Thunen theory of location can be applied to study urban land use. The proposed method is developed on the basis of 'general accessibility' and the physical characteristics of the site.

The proposed method starts with an analysis of the 'general accessibility' of the land. This factor includes criteria like road length and width, intensity of use, pedestrian and vehicular flows, proximity of service centre, transport facilities, amenities and recreational facilities, etc. In addition, the method requires an analysis of a building land factor which incorporates criteria like plot ratio, street frontage, water supply and sewerage connection. Weighting is then given to each criterion according to its impact on the location of commercial land. To the relatively uniform section of a sample road, the respective value of each criterion is assessed. According to the proposed method, the total value of the impact of the respective criteria on that particular road section is calculated. After converting the total value into a location coefficient, the result can be used to assess the land value in transaction data deficient areas or monitor the dynamic variation of commercial land value.

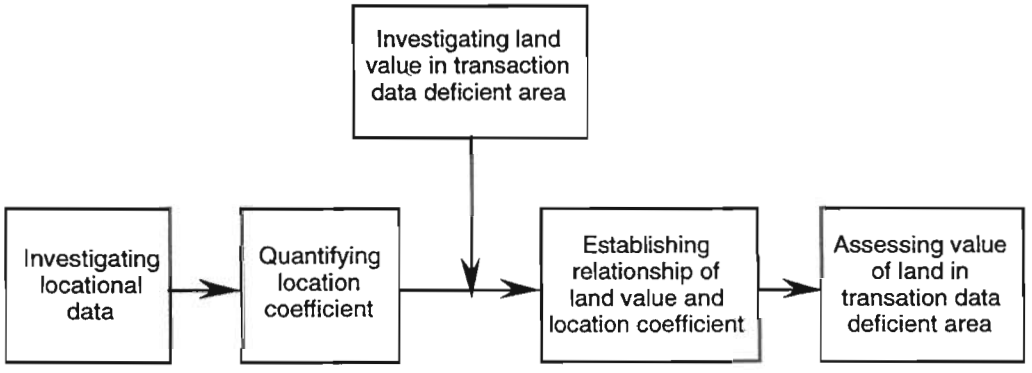
Based on the urban land location theory, the locational characteristics of commercial land, the successful valuation experience in developed cities (Lin, 1995) and the practice of urban land use grading in China in recent years, the following equation for the valuation of urban commercial land is formulated:

$$L = F_r + F_b + F_h \qquad \text{equation 1}$$

where L = location coefficient of commercial land
F_r = road condition coefficient
F_b = prosperity coefficient
F_h = building land coefficient

The relevant coefficients will be discussed in details in the next section. It is apparent that the underlying theory of the above equation is in line with the street-unit-foot valuation method used for commercial land valuation in Japan and Taiwan. The proposed method is given the name "Location Coefficient – Land Value Conversion Method" (LCM) and is shown diagrammatically in the flow chart in Figure 1 below:

Figure 1 Location Coefficient – Land Value Conversion Method flow chart



Determination of relevant coefficients

The determination of relevant coefficients in the equation is explained below. For illustration, a small city, the Shangyu City, is used for a case study. This city is about 90km east of the Zhejiang Province capital city Hangzhou and 100km south of Shanghai. It has an area of 18km^2 and a population of 150,000. The First Department Store (TFDS) in Jiefang Street is the busiest spot in the city and is used as the reference point in this study. The streets mentioned in this study are the prominent commercial streets in the city.

a) Road condition coefficient

The road condition coefficient reflects the consolidated influence of the length, width, use condition, pedestrian flow, vehicular flow of the road. The various criteria of the coefficient have an impact on the flow of pedestrian and materials, transportation cost and time cost. They also affect the socioeconomic activities such as the frequencies and chances of people meeting each other and the exchange of goods. Accordingly, the road condition coefficient is related to whether the locational condition can be transformed into real economic benefit. The coefficient is determined by having regard to five criteria, namely, road length, road width, use condition, pedestrian flow and vehicular flow. The Delphi survey method is used to determine the weighting of each criterion. A total of 3 separate surveys of 18 valuation experts in the city were carried out and the average of the results was calculated to get the individual weightings. Based on the weightings and the relative importance of each road section in terms of each criterion, the various road condition coefficients is calculated using the weighted sum model. See Table 1 below for the results:

Table 1 Road condition coefficients

Items (Wt) / Coefficient / Roads	Length (0.10)	Width (0.20)	Use Intensity (0.24)	Pedestrian Flow (0.28)	Vehicular Flow (0.18)	Road Coef. (F_r)
Jiefang Street (nth of TFDS)	7.8	9.6	24.0	28.0	18.0	87.4
Jiefang Street (sth of TFDS)	7.8	9.6	5.2	7.2	3.2	33.0
Longshan Road	3.0	8.2	12.4	15.4	8.5	47.5
Shengli Road	2.2	5.2	8.0	7.6	6.1	29.1
Xinjian Road (sth of Wenhua Rd)	5.2	5.2	13.9	12.2	4.6	41.1
Xinjian Road (nth of Wenhua Rd)	5.2	5.2	7.6	4.9	2.6	22.9
Qingchun Road	6.2	5.2	9.5	11.5	6.8	39.2
Huang Street	2.3	2.2	3.1	5.5	5.6	18.7
Benshan Road	2.1	2.0	3.5	5.6	3.5	16.7
Laodong Road	2.0	4.0	6.0	5.2	4.7	21.9
Fengshan Road (w. of railway stn.)	2.3	4.1	7.7	14.4	9.0	37.5
Fengshan Road (nth of railway stn.)	2.1	2.1	3.2	3.6	2.4	13.4
Renmin Road (central)	8.0	18.0	22.6	16.4	10.7	75.7

b) Prosperity coefficient

The prosperity coefficient reflects the accumulation of certain functions of the city such that it results in great attraction to enterprises and residents, and likewise creates high return and profit on the land. Depending on its location and the relative distance from business centre and facilities, there is a big difference in retail commercial land value. For example, retail commercial land value is high if there are department stores, cinemas and markets, and vice versa. Accordingly, commercial centres, large transport facilities, amenities, and recreational facilities are chosen as criteria of prosperity. Using the Delphi survey method and the weighted sum model, the result of various prosperity coefficient of individual road sections is shown in the following table:

Table 2 Prosperity coefficients

Items (Wt) / Coefficient / Roads	Commercial/ service centre (0.4)	Transport facilities (0.2)	Amenities (0.3)	Recreational facilities (0.1)	Prosperity Coefficient (F_b)
Jiefang Street (nth of TFDS)	40.0	16.0	27.0	10.0	93.0
Jiefang Street (sth of TFDS)	13.0	9.0	10.0	2.0	34.0
Longshan Road	36.0	11.0	12.0	7.0	63.0
Shengli Road	16.0	5.0	9.0	4.0	34.0
Xinjian Road (sth of Wenhua Rd)	19.0	5.0	13.0	6.0	43.0
Xinjian Road (nth of Wenhua Rd)	10.0	5.0	5.0	3.0	23.0
Qingchun Road	19.0	5.0	18.0	6.0	48.0
Huang Street	12.0	4.0	4.0	2.0	22.0
Benshan Road	14.0	7.0	14.0	6.0	41.0
Laodong Road	18.0	9.0	12.0	6.0	45.0
Fengshan Road (w. of railway stn.)	20.0	12.0	17.0	7.0	56.0
Fengshan Road (nth of railway stn.)	7.0	3.0	4.0	2.0	16.0
Renmin Road (central)	31.0	16.0	24.0	7.0	78.0

c) Building land coefficient

The building land coefficient reflects the consolidated influence of individual physical characteristics of the lot. The physical characteristics include the land use condition, development intensity, water and sewerage connections, daylight condition etc. Accordingly, plot ratio, water supply and sewerage connection, and aspect of street frontage are chosen as criteria to measure the building land coefficient of a lot. Again the Delphi survey method and weighted sum model are used to obtain the results. The building land coefficient of individual road sections is shown in the Table 3 below:

Table 3 Building land coefficient

Items (Wt) / Roads / Coefficient	Plot ratio (0.5)	Aspect of street frontage (0.3)	Water supply/sewerage condition (0.2)	Building land coefficient (F_h)
Jiefang Street (nth of TFDS)	45.0	21.0	20.0	86.0
Jiefang Street (sth of TFDS)	31.0	17.0	16.0	64.0
Longshan Road	38.0	26.0	17.0	81.0
Shengli Road	24.0	24.0	14.0	62.0
Xinjian Road (sth of Wenhua Rd)	21.0	13.0	12.0	46.0
Xinjian Road (nth of Wenhua Rd)	14.0	10.0	10.0	34.0
Qingchun Road	27.0	14.0	13.0	54.0
Huang Street	8.0	10.0	10.0	28.0
Benshan Road	18.0	18.0	10.0	46.0
Laodong Road	22.0	23.0	12.0	57.0
Fengshan Road (w. of railway stn.)	25.0	22.0	14.0	61.0
Fengshan Road (nth of railway stn.)	10.0	6.0	6.0	22.0
Renmin Road (central)	45.0	28.0	18.0	91.0

In the above tables, the reference point (TFDS) is given a value of 100. All road sections are rated according to their relative
importance to the reference point. The rating of each road section is obtained using the following methods (SLA, 1990):

1. Diminishing distance method

This method is used to rate the prosperity criteria of each road section. The method is represented by the formula below:

$$f_1 = F^{(1-r)}$$

equation 2

where f_1 = coefficient of prosperity factors
F = value of the reference point
r = relative distance of subject land from the reference point

2. Relative value method

This method is used to rate the road condition criteria and the building land criteria of each road section. The following formula is applied for these purposes:

$$f_2 = \frac{(X_i - X_{max})}{(X_{max} - X_{min})}$$

equation 3

where f_2 = coefficient of respective road condition and building land factors
X_i = observed value
X_{max} = maximum value
X_{min} = minimum value

Result

According to equation 1, the total of the three coefficients (f_r, f_b and f_h) represents the location coefficient of individual road sections. The location coefficient for the other road sections is listed in Table 4 below. The location coefficient of Jiefang Street (north of TFDS) has been assigned a relative value of 100. Having regard to this figure, the relative location coefficient of other road sections is calculated as per Table 4

.

Table 4 Comparison of Land value assessed using the (LCM) and Capitalisation Method

Coefficient / Roads	Road Coef.	Prosperity Coef.	Building Land Coef.	Location Coef.	Relative value	Land value (Yuan/m^2) (LCM)	Land value (Yuan/m^2) Capitalisation method
Jiefang Street (nth of TFDS)	87.4	93.0	86.0	266.4	100	3065	3065
Jiefang Street (sth of TFDS)	33.0	34.0	64.0	131.0	49	1502	1468
Longshan Road	47.5	63.0	81.0	191.5	72	2198	2291
Shengli Road	29.1	34.0	62.0	125.1	47	1450	1433
Xinjian Road (sth of Wenhua Rd)	41.1	43.0	46.0	130.1	49	1503	1471
Xinjian Road (nth of Wenhua Rd)	22.9	23.0	34.0	79.9	30	920	911
Qingchun Road	39.2	48.0	54.0	141.2	53	1631	1781
Huang Street	18.7	22.0	28.0	68.7	26	791	780
Benshan Road	16.7	41.0	46.0	103.7	39	1197	1212
Laodong Road	21.9	45.0	57.0	123.9	46	1409	1407
Fengshan Road (w. of rail stn.)	37.5	56.0	61.0	154.5	58	1783	1765
Fengshan Road (nth of rail stn.)	13.4	16.0	22.0	51.4	19	597	603
Renmin Road (central)	75.7	78.0	91.0	244.7	92	2848	2837

The unit-foot value at Jiefang Street (north of TFDS) is then assessed using the capitalisation method and the street-unit-foot valuation method and is used as a benchmark value. Based these results and

can be seen that the results from the LCM and the capitalisation method are very close with a tolerance of about 1%. This shows that the LCM meets the requirements of a decent valuation method. Since this method requires fewer resources, a pricing system can be established readily. The ready development of a pricing system having regard to the various location coefficients in Table 4, the land value of each road section can be calculated. The accuracy of the land value calculated is verified by land value assessed with the capitalisation method. The results are shown in the last two columns of Table 4. It
makes the method suitable for accessing commercial
land value even if the market is fluctuating. It can also be used for monitoring the variation of land value.

Conclusion

In China, the majority of cities do not have a high level of economic development. It follows that their property markets are also underdeveloped. The problems of having an irregular property become particularly acute in less developed cities. In these cities, transaction data is not readily available and that comparable properties are often scattered unevenly. Accordingly, it is difficult to use conventional valuation methods to assess land value. Unlike big cities that have the expertise and resources to prepare a BPS, the less developed cities simply do not have the conditions to follow suit This paper introduces a new method – the LCM – to value commercial land in less developed cities in China. It is based on the urban land location theory and uses the idea of quantifying the key locational attributes to calculate the corresponding location coefficient. The location coefficient is then used to calculate the land value. This method requires fewer resources and pricing

system can be established within a short time. Although the method is developed to value commercial land, the idea can be easily applied to value land of different uses. This method provides an alternative to the BPS and the relevant land authority should seriously consider its application for LUR prices determination.

Table 4 Comparison of Land value assessed using the (LCM) and Capitalisation Method

Coefficient / Road	*Road Coef.*	*Prosperity Coef.*	*Building Land Coef.*	*Location Coef.*	*Relative value*	*Land value (Yuan/m²) (LCM)*	*Land value (Yuan/m²) Capitalisation method*
Jiefang Street (nth of TFDS)	87.4	93.0	86.0	266.4	100	3065	3065
Jiefang Street (sth of TFDS)	33.0	34.0	64.0	131.0	49	1502	1468
Longshan Road	47.5	63.0	81.0	191.5	72	2198	2291
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