A Review of Mass Valuation in the Market

Xueying Wu[1,2,3,4,5]

[1] Shaanxi Provincial Land Engineering Construction Group Co.,Ltd. Xi'an 710075, China

[2] Key Laboratory of Degraded and Unused Land Consolidation Engineering, the Ministry of Natural Resources, Xi'an 710021, China

[3] Institute of Land Engineering and Technology, Shaanxi Provincial Land Engineering Construction Group Co.,Ltd. Xi'an 710021, China

[4] Shaanxi Provincial Land Consolidation Engineering Technology Research Center, Xi'an 710075, China

[5] Land Engineering Technology Innovation Center, Ministry of Natural Resources, China

Abstract

This report reviews Mass Valuation, uses valuation models, introduces the main approaches to value the properties by mass valuation models in the market, and discusses the application of Computer-Aided Mass Appraisal (CAMA).

Keywords

Mass Valuation; Cost; Computer-aided Mass Appraisal (CAMA).

1. Introduction

Mass valuation refers to the systematic valuation of properties of different categories on a common valuation day by following the same valuation principle as a single valuation and applying standardized statistical data processing methods. It is an evaluation method that will use computer technology to make it more convenient. Mass valuation is not a terminating process, after a time, it will have to be repeated, and the results will be affected by previous data [1]. Further, more professionally, the International Association of Assessing Officers (IAAO) define it as the activity of evaluating a set of property values using common data, standardized methods, and statistical inspection techniques [2]. International Valuation Standard (IVS) also have made similar interpretations of mass valuation, that is, application of systematic, uniform, and considering statistical testing and analysis of the results of evaluation methods and techniques to evaluate the activities of determining the date value of multiple properties [3].

Mass valuation technology has been around for a long time. In western developed countries, the technology has become mature, such as the United States, Britain, Canada and so on. Developing countries, such as South Africa and Lithuania, are also beginning to experiment with building their own batch assessment systems. South Africa has set up pilot projects where data are plentiful, and added real-time trading data, while Lithuania has been active in technical cooperation with developed countries on the one hand, and in training its own professionals on the other. In China, Hong Kong applied assistive technology in batch evaluation as early as 1980 and kept updating; In mainland China, only Beijing, Shanghai, Hangzhou and other cities are piloted. The algorithms are basically the same everywhere, but different in influencing factors and correction.

Compared with the evaluation of a single property, mass valuation avoid the repetition of similar evaluation process through the establishment of evaluation model, which is improve the evaluation efficiency, reduce the cost evaluation, increase the transparency of the comments, reduces the human factors of interference. Because of this, it needs a mass of reliable

real estate basic database, and constantly adjusts. Therefore, computer technology is usually used as an auxiliary means. There are three main mass valuation models: comparison (market) approach, income approach and cost approach.

2. Comparison (Market) Approach

The comparison (market) method, which can be divided into direct comparison and indirect comparison in more detail. It is an approach that comparing a target property with recently traded properties that have similar nature, according to different characteristics, such as location, area, and field of view, adjusting known prices to obtain a reasonable value.

2.1. Direct Comparison Approach

It is the direct comparison of a target with a case. Generally, there are eight steps: collecting transaction cases, selecting comparable cases, establishing comparable price basis, correcting transaction conditions, adjusting market conditions and adjusting real estate conditions, obtaining the specific quasi-price of a single comparable case and obtaining the final price. adjusting real estate conditions is the core part. In this step, most parameters including location factor, equity factor and weight of influence factor are adjusted, and then the percentage method (accumulation or continuous multiplication), margin method, or compound method are selected to obtain the specific price according to the situation.

In order to ensure that the valuation does not exceed a reasonable range, the direct comparison method usually requires a large number of transaction instances as the benchmark before it can select a comparable instance that meets the requirements. In addition, more parameter correction is involved in the valuation, if more benchmark cases are selected in the evaluation period in order to ensure accuracy, the speed of mass valuation is affected.

2.2. Indirect Comparison Approach

Indirect comparison method is to partition first. The more detailed the division, the higher the accuracy of the assessment. Generally, it is required to divide into districts, and it is best to divide into buildings. In the lowest partition, select a standard instance that reflects the partition commonality, regardless of the partition commonality of the previous level. For example, when taking the building as the lowest level, only the orientation, view, area and so on need to be considered, The characteristics of the community as the lowest partition, such as the distance category of the transportation station, need not be considered. Then adjusting real estate conditions and choosing the calculate method. Considering the problem of data maintenance, since the correction coefficient in the formula of accumulation and continuous multiplication is relatively fixed, it is often chosen as the calculation method in practical application.

The biggest difference between indirect comparison approach and direct comparison approach is that it avoids the selection of a large number of actual cases, and it is difficult to obtain the cases actually traded, which is also the reason why indirect comparison approach has a wide range of applications. Although the accuracy of the indirect comparison method may be affected by the late updating of data, the error is small and acceptable in stable market conditions.

Due to its relatively mature and practical technology, comparison (market) approach is applicable to the real estate that have a large stock and are frequently traded in the current market, such as housing, office buildings, shops and standard factory buildings. The current mass valuation model of real estate prices in Hangzhou is based on this method, and Beijing's impact factor coefficient is almost completed using multiple linear regression analysis which is included in this method.

3. Cost Approach

The cost approach requires maintenance of computerized cost schedules and equations, derivation of depreciation schedules from market data, and reconciliation of cost-generated values with market. It is assumed that the value of the property should not exceed the cost of acquiring the land plus the cost of constructing alternative buildings of equal quality and quantity. The basic general model is MV = IV + LV, where MV is market value, IV is improvement value, and LV is land value. During model calibration, coat tables, depreciation schedules, time and location modifiers and market adjustment factors should be considered.

The cost table includes adjustments per square foot and lump sum adjustments to determine the new cost. Cost data can also be obtained through monitoring agencies, evaluation companies, and local expense schedules. In making such adjustments, the copyright shall be respected. Depreciation schedules, in order for the value of the property to reflect the local market at the time, should be guided by the establishment of conditional grading and estimate effective age [4]. Time and location modifiers are used to adjust cost data, while market adjustment factors are used to correct market factors in models as in comparison approach.

This method is suitable for real estate with few transactions and no potential economic benefit, such as schools, hospitals, military barracks and other real estate for public use, as well as steel works, power plants, oil fields and other real estate that are specifically involved or targeted to specific users.

4. Income Approach

The income approach predicts the future income of the appraisal object and calculate the present value by discounting the future income. If using direct capitalization, value is equal to the net operating income divided by over capitalization rate, also can use the gross income instead of net operating income, these values are typically available units or estimation of statistical models. The valuation process is generally divided into four steps: determining the future earnings period, obtaining the future net earnings, obtaining the rate of return and calculating the earnings price.

Besides market rent, vacancy and expenses ratio, rates and multipliers are all considered when making model adjustments to this approach. The former is necessary to adjust potential gross income to typical net income, and these ratios should be based on an objective research of the market. The latter is used to convert income into market value, often depending on the type of property.

In theory, income approach can be applied to all properties which has income flow. But in practice, it generally is applicable to the property that is the same type of rent difference is small, has slight fluctuation in market. For housing, there may be a phenomenon that its price beyond value in large city, in order to ensure precision, market approach is better. When commercial property as a single assessment can choose this method, but in mass valuation, due to different rents in different positions, and irregular, if each one is calculated separately and then added, the workload is too large.

The three mass valuation models mentioned above are theoretical foundation (model building) for mass appraisal.

5. Application of Computer-assisted Mass Appraisal (CAMA)

Since mass valuation requires many accurate original databases, practically, we often use Computer-assisted mass appraisal (CAMA) to establish mass appraisal systems for reevaluation, data maintenance, and value update. In some areas, GIS are also combined with

CAMA. In general, Computer-assisted mass appraisal can be divided into three methods in practice: Reference Assessment Approach, Multiple Regression Analysis and Regression Based Index. Mathematical statistics are used to correct the valuation objects. Since CAMA build models based on market price/rent, they belong to Comparison (market) Approach.

Using CAMA, in the early stage of data collection requires a large cost, but after the completion of the system, the cost of maintenance and update is not very high. As mentioned above, developed countries have also made a lot of preparations before establishing mass appraisal systems. In Ontario, Canada, more than 300 influencing factors were summarized by detailed classification of various properties, and the whole province was divided into regions, and a system was established based on the market comparison method. After the completion of the system, the CAMA system conducted a batch evaluation of 4 million each year, and its database was open to the society, which greatly improved the efficiency. For mainland China, a large CAMA system cannot be built in a short time, mass valuation is still in the pilot phase. Beijing use Multiple regression to analyze the impact factors, due to the perfect information of the real estate market. Based on the market method, Hangzhou makes full use of the data and gives the benchmark price of almost every building. However, in other cities such as Lanzhou and Xi 'an, due to the lack of long-term accumulation and input of raw data, scholars are also exploring constantly suitable mass valuation model algorithms. From existing research, based on the market method, the research scholars chose particle swarm optimization algorithm, parameter regression analysis and other methods based on local conditions, and modified some algorithms of CAMA to roughly carry out mass valuation of urban property, which can help CAMA to build some accumulated data [5].

Mass valuation is more and more popular in the world, the technology tends to mature and constantly updated. However, in China, especially in mainland China, it will still take some time to build a CAMA system based on market approach, which has four subsystems of data management system, sales analysis system, valuation system and administrative system and maybe can also regards cost approach and income approach as copies add to the system according to special needs.

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