

学校编码：10384

分类号_____密级_____

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UDC _____

厦 门 大 学

博 士 学 位 论 文

房地产计税的批量评估系统研究
---基于特征因素识别与分类方法应用分析

Research on the Real Estate Tax Mass Appraisal

**---Applied Analysis on the Approach of Character Identifying and
Classifying**

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专业名称：资产评估

论文提交日期：2013年04月

论文答辩时间：2013年 月

学位授予日期：2013年 月

答辩委员会主席：_____

评 阅 人：_____

2013年 月

厦门大学博硕士论文摘要库

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摘要

以房地产为主要课税对象的财产税是世界各国地方政府财政收入的主要来源，科学合理对应税房地产的计税价值评估是该税制的重要组成部分。由于影响中国房地产市场价格的因素复杂、多变，特别是中国房地产市场短期波动性显著，导致房地产评税系统中有关特征因素识别与评估模型设定等，变得异常复杂和困难。本文在美国评估促进会（Appraisal Foundation, AF）的《专业评估执业统一准则》（Uniform Standards of Professional Appraisal Practice, USPAP）（2012-2013）规定的房地产计税批量评估系统标准流程的基础上，以选择采用特征价格估值模型为前提，结合中国房地产市场的特点，探讨主要应用聚类与判别分析方法，对房地产特征因素进行系统识别与分类的方法，将 USPAP 准则 6 “批量评估系统标准程序”中的流程 3 扩展为“特征因素识别与分类子系统”，提高标准流程 3 与标准流程 4 之间的关联程度。旨在降低评估模型设定与模型校准的难度，以期提高批量评估系统在境内房地产计税评估的适用性。

本文首先分析了特征价格模型、城市住宅地租模型、人工神经网络模型等的主要特点及在实际应用中的局限性。指出在房地产税基批量评估中选择采用的评估模型必须符合税基评估对评估结果公允性、一致性和统一性的要求，评估模型必须具备稳健性；应具有较强的经济解释性及较易进行校准等特点。而且评估模型的选择很大程度上影响了特征因素识别与分析的方向。确定本文选择采用传统的多元回归特征价格模型，并在此前提下研究房地产特征因素的识别与分类方法。第二是分析了房地产价格的波动及其对房地产税基评估的影响。第三是明确了特征因素识别与分类的主要内容，确定了特征指标识别与分类的三项基本原则，并系统地阐述了特征指标识别与分类的基本步骤及相关技术。第四是提出了“特征因素识别与分类子系统”的设想，从系统论的角度分析了该子系统的主要特点。并且放宽批量评估系统估值模型选择的限制，利用特征因素识别与分类子系统，构造一个串联型 BP 神经网络评估模型，以此论证和说明特征因素识别与分类子系统确实在一定程度上完善了 USPAP 中的房地产计税批量评估系统。并且从效益、技术、财务（成本）等几个方面，分析利用扩展后的批量评估系统，

实际建立一个房地产税基批量评估系统的可行性。第五是选定房地产市场相对活跃、商品房投资属性比较显著的国内某市为评估对象（住宅）所处的市场区域，进行实证分析研究。检验了“特征因素识别与分类子系统”相关技术、方法的合理性、系统的有效性，以及将该子系统嵌入批量评估系统的可行性。实证分析的结果表明：改进后的房地产税基批量评估系统，符合中国房地产市场特点，有效地解决了特征价格模型在实际应用中存在的主要问题，可以提高批量评估系统在我国房地产计税评估的适用性。最后是总结本文研究的主要结论和局限，明确了进一步研究的方向。

本文较为系统地论述“房地产特征因素识别与分类子系统”，扩展了 USPAP 中的房地产计税批量评估系统标准流程 3，试图从理论上进一步完善房地产批量评估系统中的房地产特征因素有关内容，并对该系统的房地产特征因素传统的识别方法进行改进，提高了识别的程度，增加了指标集描述、线性关系、弹性关系等定性或定量分析内容。本文在研究方法上的特点是注重统计分析等数学分析方法的应用，在规范分析与实证分析过程中，应用了聚类分析、判别分析等统计分析方法，以及线性函数拟合等数值分析方法，力图促使规范分析过程更加严谨，实证分析结果更加可靠。

关键词：房地产计税 税基批量评估 聚类与判别分析 特征因素识别与分类方法

Abstract

The property tax, which takes the real estate as the main taxation object, is the main source of revenue for local governments all over the world. The scientific and rational appraisal of the real estate tax base is an important component of the property tax system. Because the characters affecting the real estate price are complex and volatile, especially the short-term fluctuation in the Chinese real estate is quite notable. They cause the identifying of the characters in the appraisal and the constructing of the evaluation model to be extremely complicated and difficult. On the basis of the standard procedures of the real estate tax mass appraisal, from the Uniform Standards of Professional Appraisal Practice (USPAP 2012-2013), which is issued by the Appraisal Foundation (AF), this dissertation takes the hedonic model as the premise and discusses the systematical approaches of the analysis, identifying and classifying of the characters of the real estate, using the cluster and discriminant analysis of the statistical analysis methods, combining with the characteristics of the Chinese real estate market. It extends Procedure 3, Rule 6 of the Mass Appraisal to the Characters Identifying and Classifying Subsystem, and improves the relevance between the standard Procedure 3 and Procedure 4. The purpose of this study is to reduce the difficulty of the construction and calibration of the appraisal model, and to improve the applicability of the real estate tax appraisal in China.

The dissertation begins with an analysis of the main features of the hedonic model, the urban residential rent model and the artificial neural network model, and the limitations in the practical application. It points out that the valuation model, using in the estate tax mass appraisal, must be consistent with the requirements of the impartiality, consistency, and uniformity of the appraisal results. At the same time, the valuation model must be robust, economically interpreted, and easily calibrated. Moreover, the choice of the valuation model greatly affects the direction of the identifying and analysis of the characters. Therefore, this dissertation selects the

traditional multiple regression hedonic model, and takes it as the premise of the study. Secondly, analyses the fluctuation of the real estate price, and its impact to the real estate tax mass appraisal. Thirdly, it defines the main content and establishes three basic principles of the characters identifying and classifying, and systematically elaborates the basic steps and related techniques. Fourthly, it puts forward the conception of the Character Identifying and Classifying Subsystem, and analyses the main features of this subsystem from the perspective of the systematic theory. It also relaxes the constraint of valuation model selection, uses the Character Identifying and Classifying Subsystem to construct a series BP neural network model, to demonstrate the improvement of the extended mass appraisal system of USPAP, which containing the subsystem. It also analyses the feasibility of the building of the real estate tax mass appraisal system while using the extended mass appraisal system from the perspective of efficiency, technique and finance (cost), etc. Fifthly, it selects a certain city to be the market area of the valuation object (residential houses), whose market is relatively active, and has significant investment property, to conduct an empirical study. The empirical study testified the technical rationality of the Character Identifying and Classifying Subsystem, and the feasibility of embedding the subsystem in the mass appraisal system. The empirical result indicates that the extended real estate tax mass appraisal system is consistent with the characteristics of the Chinese real estate market, and effectively solves the main problems existing in the application of the hedonic model, thus improving the applicability of the system. Finally, it summarizes the principal conclusions and limitations of the research, proposes the direction for the further research.

The Character Identifying and Classifying Subsystem, systematically discussed in this dissertation, extends the Standard Procedure 3 of the mass appraisal of USPAP, and improves the related content of characters in the real estate mass in theory. The subsystem improves the traditional identifying method, promotes the degree of the identifying, and develops a set of qualitative and quantitative analysis techniques, such as factor set describing, linear analysis, elastic analysis, etc. All in all, the study method in this dissertation is characterized by its emphasizing on the application of

the statistical analysis, numerical analysis and other mathematical analysis methods. It not only makes the normative analysis process more rigorously, but also makes the results of the empirical analysis more reliable.

Keywords: Real estate tax appraisal; Tax mass appraisal; Cluster and discriminant analysis; Approach of character identifying and classifying

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