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# 中　国
# 矿业城市研究

## ——结构、演变与发展

周德群　汤建影　程东全　著

Study
on
Mining
Cities
in
China

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## 内容提要

本书对我国矿业城市的沿革、界定与分类问题进行了探讨，并从中选出51个矿业城市作为样本，对其社会经济结构与动态演化特征进行了研究，提出了矿业城市规避风险的一些政策建议。

本书的主要特点是综合运用管理学、经济学、社会学、统计学、数理科学、系统科学等多学科的相关理论与方法，注重实证研究与规范分析的有效结合、定性研究与定量研究的有效结合。

本书是从事区域经济与管理、城市经济与管理、资源经济与管理的科研人员、大专院校的本科生和研究生及各级领导的重要参考书。

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# 序　言

## （一）

我国的矿业城市产生于19世纪70年代，起源于煤炭、铁和有色金属等矿产资源的开采。我国矿业城市的起源有三种类型：基于传统手工业的历史矿业城市，如自贡与景德镇；近代工业化产生的矿业城市，如抚顺、阜新、徐州等；建国以后以“厂”“市模式建立的矿业城市，如大庆、攀枝花等。目前，我国已崛起的矿业城市达300多个，约占到我国城市总数的四分之一，构成了我国城市体系的重要部分，为加速我国城市化进程做出了重要贡献。矿业城市也是我国城市经济乃至整个国民经济的重要组成部分，是国家经济建设所需能源和原材料的主要供应基地，提供了93.6%的煤炭、90%以上的石油、80%以上的铁矿石、70%以上的天然气。矿业城市在区域经济发展中起着“增长极”的作用，由于矿业城市的辐射与带动，在很大程度上改善了我国区域经济格局，促进了区域经济的协调发展。矿业城市还是我国现代工业体系的重要组成部分，对我国经济社会的稳定和发展，对增强国家经济实力，具有举足轻重的作用，矿业城市以占全国24.7%的人口提供了37.7%的国内生产总值。矿业城市的兴起，带动与促进了矿产品加工业和服务业的发展，为社会提供了大量的就业岗位。据估计，全国矿业城市已吸纳人口达3亿多人，这对于改善当地居民的物质文化生活、加快建设富裕型小康社会发挥了重要作用。我国现代化建设离不开矿业，矿产的开发和加工必然导致人口和社会经济资源的聚集，从而形成矿业城市。随着我国西部大开发战略的推进与实施，西部地区还会

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出现一批新兴的矿业城市。矿业城市以其特有的资源和地域特点成为国家区域战略的重要组成部分。

## (二)

由于矿业城市对矿产资源具有高度依赖性,由此形成"资源依赖型"的社会经济结构,这种结构如不加以调适,当采矿业发展到一定阶段后,容易使矿业城市陷入结构性危机。结构性危机的主要表现为:采矿业及其相关产业萎缩,导致经济滑坡;经济滑坡又进一步导致失业率上升、就业矛盾尖锐化,从而严重影响社会稳定;主导产业的萎缩,导致矿业城市财政困难,无力支付保障社会稳定的福利性开支;对采矿业长期的过分依赖,导致城镇功能不健全,基础设施落后,住房难、行路难、吃水难、入学难、看病难等问题也随着采矿业的萎缩而日益显化;采矿业对资源与环境的破坏,导致矿业城市的生态环境恶化,使得矿业城市对优质生产要素失去吸引力,更使得矿业城市陷入一种恶性循环。国内外的经验表明,矿业城市的发展结果存在两种趋向,一种是类似于苏联巴库油田以及我国许多矿业城市的发展道路,由于在开发早期忽视可持续发展,因此往往容易陷入"矿竭城衰"的结构性危机;另一种如德国的鲁尔矿区,美国的洛杉矶油区、休斯顿油区和阿巴拉契亚矿区,我国的平顶山市、徐州市等,由于较早地采取了有关风险防范的战略和措施,资源虽面临枯竭,但城市依然得到了繁荣和发展。由此可见,矿业城市在发展过程中存在较大的风险,这种风险一方面来自市场环境,即市场对矿产品的需求情况,另一方面来自主导企业,即企业对市场变化和资源变化能否进行适应性调整。矿竭不一定城衰,关键在于矿业城市在开发建设中能否走可持续发展道路,能否适时地进行结构调整。

矿业城市的可持续发展是我国可持续发展总体战略中的重要组成部分,矿业城市能否走上可持续发展道路关系到我国可持续

发展的总体进程。本书正是本着这一主旨而写，通过本书，我们试图回答我国矿业城市的现状、演变的特征与轨迹以及主要的影响变量，提出矿业城市可持续发展的相关政策建议。

## （三）

本书共分 7 章。第一章在系统梳理关于矿业城市理论研究成果的基础上，构造了本书的研究框架。

第二章考察了矿业城市的历史沿革，界定了矿业城市的概念，提出了矿业城市分类方法以及矿业城市选取的三条标准，在此基础上，选定了我国地级以上矿业城市共 51 个。

第三章定量分析了这些城市的经济与社会发展现状，探讨了矿业城市经济发展与所依托的资源的品种、开发阶段的关系，并从经济体制、经济政策、资源衰竭、科技进步与经济一体化等方面解释了矿业城市出现结构性危机的原因。

定量研究一直是相关研究的薄弱环节，本书试图在这方面做出一些尝试。第四章至第五章采用定性、定量相结合的方法，对矿业城市发展中的相关问题进行了研究：通过 DEA 模型测算了我国 51 个矿业城市的规模效率，探讨了规模效率与城市规模、所属地域等因素的关系；首次引入矿业城市生产函数的概念，得出了煤炭类与综合类矿业城市的生产函数，并测算了各自的技术进步贡献率；采用全局主成分分析方法，描绘了我国 50 个较大规模矿业城市的发展轨迹（1990～1999 年），并分析了不同矿业城市发展轨迹的异同。

矿区是与矿业城市密切相关的概念，许多矿区发展到一定规模以后就会演变成矿业城市（镇）。我国地域辽阔，矿区类型较多，表现出多样性、复杂性和发展道路的差异性。在第六章，我们首先对矿区可持续发展的定义和具体内容进行了探讨，接着从两个维度对矿区进行了分类，一是按照矿区与中心城市的关系划分，另一

个是按照矿产资源开采的生命周期划分，并在此基础上对矿区做出复合分类，对其组合特性进行了研究，对其发展道路的选择问题做了探讨。

基于上述研究成果，第七章对矿业城市实现可持续发展的政策措施进行了研究，并从动态监控系统、可持续发展基金和产业壁垒三个方面提出了有关政策建议。

我国的矿业城市大多是在计划经济体制下形成的，计划经济体制的弊端、国有大型企业在改革中出现的问题，在许多矿业城市中可以说是暴露无遗的，因此矿业城市的可持续发展问题涉及到政治、经济及社会等全方位的问题，这是我国矿业城市的特殊性。本书是在这一领域的初次探索，难免挂一漏万，如能对这一领域的理论研究起到抛砖引玉的作用，我们便深感欣慰。

全书由我与我的研究生汤建影、程东全两位同志合作完成，大部分章节是共同讨论的结果。汤建影同志较为扎实的定量分析基础和数据分析能力无疑为本书增色不少。中国矿业大学出版社的姜华女士严谨认真的态度令人难以忘怀，她以出色的编辑工作使本书尽可能令人满意。

衷心感谢所有为本书写作与出版做出贡献的人们，书中任何不能令人满意的地方均是作者的责任与能力所限，恳请读者批评指正。

周德群

2002.12

# PREFACE

(一)

Chinese mining cities come into being during 1970s, as a result from the exploitation of mineral resource such as coal, iron and many nonferrous metals. There are three types of mining cities: some are history mining cities base on traditional handicraft such as Zigong and Jingdezhen; some originated from modern industrialization such as Fushun, Fuxin and Xuzhou etc; others set up by the one factory in one city mode after the founding of new China, Daqing and Panzhihua belong to this type. At present, there are more than 300 mining cities that account for one quarter of the total cities in China. They, as a main part of city system, make great contributions to accelerate the course of urbanization. They are main support economy construction, which offer 93. 6% of coal, over 90% of petroleum, over 80% of iron ore and over 70% natural gas. They play a role as the limits to growth in regional economic development. Their radiation and lead improved Chinese regional economic pattern to a great extent and promoted the coordinated growth of regional economy. Mining cities are important integrant of china's modern industry system. They play a decisive role in economic stability and development and make great contributions to enhance rational economic strength. Mining cities are home to 24. 7% of the china's population, however, their

output is 37.7% of the gross domestic product. The growing up of mining cities brings along and facilitates the development of minerals processing industries and services, which furnish a large number of employment posts. It is estimated that, there are more than 300,000,000 people working and living in mining cities, as play an important role in improving material and cultural lives of local inhabitant and in constructing well-to-do society rapidly. The exploitation and processing of minerals inevitably lead to the assembling of population and economic resources. Thus mining cities are formed. With the promotion and implement of the west China development strategy some developing mining cities will come into being in west areas. Mining cities become a significant integrant of national security for their specific resources and regionalism.

(二)

Resource-dependents social-economic structure formed in mining cities because of their high dependence on mineral resources. It is easy for them to sink into structural crisis when mining industry develops to a certain stage unless this kind of social-economic structure is readjusted to adapt to new economic environment. The principle expressions of structural crisis are as follow: (1) Economic decline result from the contraction of mining industry and its related industries; (2) Economic decline further cause rising of unemployment rate and make the employment contradiction more acute, which influence social security seriously; (3) The shrink of leading industries lead to financial straits and difficulties in mining cities so that they can't afford well-being to

ensure social stable; (4) Long-term over dependence on mining industry makes mining cities defective in function and backward in infrastructure. Many problems such as housing problems, traffic problems, enrolment problems, drinking water problems, drinking water problems and so on appear with the contraction of mining industry. (5) Mining industry damages mining cities' ecological environment and makes them lose their attraction to high quality production factors, and even make sink into vicious cycle. Experiences from home and abroad show that there are two development tendencies of mining cities: One is sink into "mines-exhausted-cities-declining" structural crisis due to that these cities neglect sustainable development at the early stage of exploitation. Ruhr Mining area in German, Los Angeles and Houston oil deposit, Appalachian, mining area in the United States, and Pingdingshan and Xuzhou in China, because that they take risk counter measures early. This shows that there are high risks during the development of mining cities. On one hand they come from market environment, that is market demand for minerals. On the other hand they come from leading enterprises that is whether the enterprises can readjust themselves to adapt to the change of market and resources. The exhausting of mine does not mean the declining of the cities. It lies in whether the mining cities lead a sustainable way during their development and construction and in whether they can readjust their industrial structure to response the time.

Mining cities' sustainable development is an important part in overall strategy of china's sustainable development. It has much to do with the overall course of china's sustainable development. The above view is the gist of this book. In this book we try to answer

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the present situation, main influence variables and evolution features and track of mining cities. Furthermore, we put forward some proposals about related policies of mining cities' sustainable development.

(三)

This book contains seven chapters. In chapter one, the research frame of this book is structured on the basis of systematically carding of research achievements of mining city is given in the light of the investigation of its history evolution. Classifying method and three criteria of selecting of mining cities are put forward. According to the three criteria 51 perfect level mining cities are selected out. In chapter three, this book quantitatively analyzes the 51 mining cities' developing situation in aspects of economy and society. The relationship between economic development of mining cities on one hand and category and exploitation phase of the resources they depend on the other hand is also investigated. In addition, this book also explains the structural crisis from such perspectives as economic institution and policy, resource depleting, technical progress and economic integration.

In this book, we try to use quantitative research, which has been a vulnerable spot of correlative research all along. In chapter four and chapter five, the paper researches the related subjects pertaining to the development of mining cities, in the quantitative and qualitative methods. It measures the scale efficiency of the 51 sample cities with DEA model, and discusses the relationship between a city's scale efficiency and its size and location. Furthermore, this book first introduces different production

functions of mining cities depending on coal and comprehensive minerals and measures the ratio of their contribution to technical progress. Using global principal component analysis, this book describes the development paths of fifty mining cities from 1990 to 1998 in China, and analyses the similarities and differences among the distinct kinds of the mining cities.

Mine area is a kind of special region in where there are many of features differ from other region such as hard industry structure, resource-relied economy, and degraded environment etc. Up to now, there are about 300 mine areas in China. And mining cities evolved by mine area more than 100, account 1/5 all of the cities. So, sustainable development of mine area related to progress of national sustainable development. In chapter six, firstly, the definition about sustainable development of mine area is given. It is defined as a mode of structure change of mine area. This mode ask that developing of mine resource not only meet national economy needs, but also meet environmental and ecological needs of mine area and whole society. Not only meet the needs of more mine resource and higher life quality of the present, but also does not compromise the ability of future generation to meet their own needs. Relative suitable exhausting speed of mine resource and lower cost can assure sustainable utilizing of mine resource and hormonal development of economy, society and environment in mine area. And second, a classification method about mine area is discussed. This method consist of two features of mine area, location feature and life cycle feature. By location feature, mine area can be classified as (A) mine area nearby city; (B) city evolved from mine area; and (C) independent mine area. By life cycle feature, mine area can be

classified as Ⅰ growing step; Ⅱ stable step; and Ⅲ reductive step. Based on the taxonomy, at last, different development mode of the mine area is explored.

In chapter seven, on the basis of above analysis result, the paper researches the policy of mining cities' sustainable development and suggests that an early warning system and a fund for sustainable development should be established, and industry withdraw barriers should be lowered.

In many mining cities the drawbacks of the planned economy system and the problems appeared in the reformation of state-owned enterprises are thoroughly exposed clue to that moist of them came into being under the planned economy system. Therefore mining cities' sustainable development is related to political, economic and social problems, as is the particularity of mining cities. This book is the first exploration in this field and may have left out many important facts. We are gratified if this book can break the ice in this field. As for the minor faults, please oblige us with your valuable comments.

This book is written by Zhou Dequn, Tang Jiangying and Cheng Dongquan. Most parts of it are the result of discussion. Tang Jianying made important contributions to this book by his sound quantitative analysis basis and data analysis capability. Mrs. Jianghua's outstanding reading and editing makes this book as desirable as possible. Finally, we express our hearty thanks to all the people who make contributions to the writing and publishing of this book.

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