

博士



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前 言

长期以来，电力产业一直实行的是发、输、配、售垂直一体化垄断的产业组织结构形式。这种组织结构尽管在一定技术条件下，适应了电力产业发展的内在要求，但随着电力产业规模变化、技术发展和市场扩大，日益暴露出严重的弊端。其中最突出的问题在于：在垂直一体化的垄断结构下，由于市场竞争的缺乏，厂商与行业缺乏尽可能降低成本、推进技术进步的动力和压力，运营效率低下。又随着自然垄断理论的新发展，人们认识到自然垄断性具有变迁性，当一定的因素发生变化时，自然垄断性将逐渐弱化甚至消失。20世纪90年代，在新理论的支持下，为了克服因垄断而带来的种种弊端，世界各国纷纷在电力产业中进行了打破传统电力产业垂直垄断一体化市场结构的措施，电力市场化改革一时风起云涌。国际电力市场化改革的实践给中国电力改革提供了思路：中国的电力改革可以通过将竞争性环节（发电、售电）与垄断环节（电网）实行分离来打破传统的纵向一体化结构。拆分后的各水平环节中，竞争环

节要防止垄断，促进竞争，垄断环节要进行激励。所以，中国电力产业改革的重要本质之一就是市场结构的改革。然而政府规制的滞后导致中国电力市场结构改革出现诸多问题，本书的研究中心就是重建电力市场结构规制。

本书的研究以马克思主义经济学和唯物辩证法为指导，充分运用西方现代产业组织理论的分析框架，在总结前人研究成果的基础上，采用规范分析与实证分析相结合、定性分析与定量分析相结合的研究方法。

本书研究的基本思路是：以电力产业的市场结构变革为线索，以重建适应新结构的规制为研究中心，沿着“研究背景—文献综述—理论分析—实证研究—问题剖析—政策框架—具体措施”的逻辑结构来组织全书。

本书首先述评了电力产业市场结构规制的相关文献和基础理论，从电力市场结构的概念入手，认为电力产业市场结构是电力产业纵向结构和横向结构的总称，纵向结构是指电力产业发、输、配、售四个环节之间的关系，具体说来它们是一体化还是分离关系，是市场交易关系还是垄断的内部管理关系；横向结构是指各个水平环节的各企业之间是竞争还是垄断的关系。随后按照电力产业规制的“规制—放松规制—重建规制”的历史演进路径对电力产业规制进行了综述，由于直接针对电力市场结构的规制是散见于对电力产业的规制措施中的，因此目前没有研究从电力市场结构这个视角去系统整理和归纳政府规制，这就是本书最大量的工作之一：按照纵向结构与横向结构的体系对政府规制进行重建。

在理论研究的基础上，本书立足于我国的特定国情，分析了我国目前的电力市场结构现状，根据现状选择了电力产业未来的目标结构。由于政府规制没有跟上电力市场结构改革的步

伐，出现了滞后，导致中国电力市场结构改革实践过程中出现了很多问题：纵向结构方面，厂网并没有真正分开，导致电网歧视性接入；横向结构方面，发电环节的企业集中度低，但投资者集中，容易出现市场力现象。进退壁垒偏高，产品差别化大，企业规模不经济，导致发电环节竞争不充分，再加上中国电力需求一直很大，所以各个企业没有提高生产效率、降低成本的激励，转向“跑马圈地”，通过扩大投资来提高效益。电网环节作为具有自然垄断性的环节，没有发挥其规模经济的优势，电网投资不足，建设滞后，安全性差，“卡脖子”现象屡有发生。

通过以上分析，本书基于我国电力产业纵向分离应该提防风险的观点，提出了对纵向结构进行风险管理的规制框架；基于电力产业横向分切的应该重视激励，提出了横向结构的激励相容的规制框架；最后在风险管理和激励相容规制框架下提出了具体的规制政策和措施。

本书包括导论和六章正文，结构安排如下：

导论在介绍本书写作的背景、基本思路、逻辑结构、创新与不足等问题的同时，重点对电力市场结构概念和电力市场规制进行了文献综述。为本书确定了研究的理论起点。

第一、二章为全书的理论基础部分。第一章介绍了自然垄断理论的新进展并分析了电力产业的自然垄断性，对电力产业的纵向和横向结构进行了理论分析，并对电力产业规制的风险管理和激励相容规制进行了理论梳理。第二章以美国、英国和日本为例探讨了电力产业市场结构改革的特点和规律，为中国的电力市场结构改革提供了国际经验的借鉴。

第三、四章为本书的现状分析部分。第三章通过大量数据描述了中国电力产业市场结构的现状，提出中国电力产业市场

结构改革问题总体来说就是“纵向分割不成功，横向缺乏竞争和激励”。从纵向来说，厂网没有真正实现分开，虽然2007年随着“920”“647”万千瓦资产的变现，标志着中国电力行业市场结构重组的第一步“厂网分开”正式完成；但实质上电网由于存在调峰电站，由于存在“内部人”持股发电资产，厂网并没有真正分开，从而导致各种类型发电企业的不公平竞争地位，出现歧视性接入状况。从横向来说，竞争性环节的竞争没有充分展开。通过国家行政划分的发电企业虽然集中度不高，但由于都是国家一个投资者，所以大家不愿意进行价格竞争；而且中国法律法规的不健全导致发电环节有着较高的进退壁垒，再加上历史原因造成的电价不一致使中国发电企业的电力产品价格差别化很大。所有这些形成合力，使促进竞争的市场结构改革的效果与预期相差甚远，五大集团纷纷转向“跑马圈地”和发电量的竞争，而非通过提高生产效率、降低成本来竞争。具有自然垄断属性的电网环节本应该发挥规模经济的效益，“厂网分开”后却出现了投资乏力、安全性降低的状况，根本原因在于政府既没有建立输配电价，又缺乏对电网环节的激励，当然不能促使电网环节快速、高效发展。基于中国电力产业的电网脆弱，技术水平低下以及国际经验，本书认为，中国未来的电力产业的纵向市场结构应该要求厂网分开（目前已实现）、输配分开和配售环节有限地分开，即只允许大用户选择供电公司而限制普通用户的选择权。第四章通过六个指标的实证分析提出，中国电力市场结构规制在保证电力安全、配合经济发展、降低企业成本、提高电力资产利用效率和改进生产效率方面发挥了积极的作用，但电力行业总体的成长并非全部来自于规制产生的资源有效配置、企业存在资源的无效率使用和A-J效应。原因在于规制在降低成本方面出现滞后和激励不足，使要素投入

组合扭曲,造成较高的成本,降低了经济效率和社会福利。上述政府对电力市场结构规制的绩效说明,为了适应新的电力市场结构,重建规制的需求日益突出。本书继续指出,在打破纵向一体化的过程中,由于各个环节的分离,容易出现电价、缺电和各环节协调的风险,所以纵向结构改革要求建立基于风险管理的规制框架。而横向环节的规制目的是促进竞争和激励,所以要求建立基于激励相容的规制框架。

第五、六章为本书促进电力市场结构优化的措施部分。第五章按照纵向各环节的协调要求,设计了交易协调规制、价格协调规制和联网协调规制。第六章按照横向各水平环节促进竞争、激励的要求,设计了进入规制、市场力规制、非对称规制以及激励规制措施。

本书有如下创新:

(1) 对电力市场运营和交易模式进行规制的研究成果很多,但基于 SCP 框架、从产业组织结构的视角对电力产业规制进行研究的成果很少。本书认为,中国电力改革的重要本质之一就是电力产业组织结构的再造,研究电力市场结构的规制就是抓住了电力产业改革的一个重点。

(2) 电力产业改革可以分为纵向结构和横向结构的再造,本书进一步深化研究,认为纵向结构的重建过程中要重视风险管理,横向结构的重建过程中要重视激励,并从纵横两个方面构造了电力市场结构的风险管理规制框架和激励相容规制框架,具有较强的理论性和实践性。

(3) 在分析中国电力产业现状、技术约束条件和借鉴国际经验的基础上,提出了中国电力市场结构目标模式的战略选择,认为中国不能走配售完全分开的模式,应该限制普通用户的选择权。

(4) 就中国电力产业的研究现状来说,专门从产业组织理论的角度研究电力产业市场结构的文章是不多的。本书以实证的方式对中国电力产业市场结构各项基本因素进行了较为深入的剖析,以期在中国电力产业的市场结构现状研究方面为后来研究者提供参考和借鉴。

关键词: 电力 电力改革 市场结构 规制 激励规制
风险管理

Abstract

For a long time, vertically integrated monopoly has been operating in electricity industry as an organization structure including power generation, transmission, distribution and sale. With the development of electricity industry, such as scale, technology and market, serious defects have exposed in this organization structure which was suitable in certain technical conditions. In monopoly structure with lack of competition, the most outstanding problem was low efficiency because there was not enough force and pressure to the corporations and whole industry to reduce costs, promote technological progress as much as possible. With the new development of natural monopoly theory, it has been recognized that natural monopoly will gradually weaken or even disappear when certain factors change. In the 1990s, supporting by the new theory, the electricity market was reformed by some measures which were put in practice in order to overcome the defects and to smash up this monopoly structure in many countries all over the world. The measure for Chinese electricity industry reform is provided

by the international practice: the monopoly can be broken by separating the traditional vertically integrated structure into competitive sectors (power generation and sale) and monopoly sector (power grids). On the same level after separation, the monopoly should be prevented in competitive sectors and the motivation should be pushed in monopoly sector. Therefore, the essence of electricity industry reform is market structure reform. In fact, there are many problems in the market structure reform because of the lag of government regulation, and this dissertation focus on how to rebuild the market structure regulation of electricity industry.

Guided by Marxist economic theory, dialectical materialism and modern Western theory of industrial organization, the dissertation bases on summarized previous studies and uses many research methods together, such as: norm analysis and substantial evidence analysis, qualitative analysis and quantitative analysis, etc.

The basic research way of thinking of this dissertation is: following electricity industry reform clue, it focuses on how to rebuild appropriate regulation under a new structure, and organizes the full text followed as the logic structure: "research background—literature review—theoretical analysis—existed problem research—reason analysis—policy framework—resolve measures".

Firstly, this dissertation summarizes the relevant literature and basic theory about electricity industry market structure regulations, and separates electricity industry market structure into vertical structure and horizontal structure. Vertical structure refers to the relations among power generation, transmission, distribution and sale, such as integration or separation. Horizontal structure refers to the relations among the same level, such as competition or monopoly. Secondly, this dissertation reviews the evolution of electricity industry regulations along Regulation, Deregulation and Regulation rebuilding. Thirdly,

this dissertation gives its option that government regulations should be rebuilt in vertical structure and horizontal structure.

Based on China's specific conditions, this dissertation analyzes Chinese current status in electricity market structure and finds out the future structure. because government regulation has not keep up with the pace of reform, many problems are exposed: in vertical structure, which the power plants are not really separated from networks leads to discriminatory access to power grids; in horizontal structure, high concentration for investors who invests power plants lead to the phenomenon of market power; the high barriers to enter or exit, products differentiation and diseconomy lead to low competition in power generation link; owing to heavy demand, the corporations would rather expand investment to obtain benefit than improve efficiency or reduce costs; as a natural monopolistic link, power grids do not make full use of their advantages based on economic scale, and many problems are occurred such as insufficient investment, lagged construction, poor security, bottleneck phenomenon.

According to the above analysis, this dissertation suggests that risk management regulations framework ought to be implemented in the process of separating vertical structure in order to beware the risk should beware of the risk, and incentive compatible regulations framework ought to be implemented in horizontal structure, because to separate horizontally should pay more attention to motivation. This dissertation also provides specific regulation policies and measures to be put in practice.

There are seven chapters in this dissertation, including the introduction and the text of six chapters, the structure is following as:

The first chapter introduces the writing background, basic ideas, logical structure, writing significance, innovation and faults about this dissertation, reviews the concept of electricity industry market struc-

ture and the electricity industry market regulations, and also establishes the starting point and theoretical basis.

The second chapter and third chapter are the theoretical basis of the dissertation. Chapter two introduces the new progress of natural monopoly theory, analyzes the natural monopoly in electricity industry, investigates the vertical structure and the horizontal structure, and studies the regulations about risk management and incentive compatible. Chapter three discusses the details and the discipline of electricity industrial structure reform practicing in USA, UK and Japan, and provides international experience for China.

The fourth chapter and the fifth chapter analyses the current situation. Chapter four displays the status of Chinese electricity industrial structure by abundant data, and concludes all the problems in a word "There is not successful separation in vertical structure, there is not enough competition and motivation in horizontal structure" In vertical structure, power plants are not really separated from power grids. Although the first step of separation was finished by liquidating the assets of "920" "647" million kilowatts in 2007, the competition among various power plants is unfair because the adjustment power station and internal stockholder lead to discriminatory access to power grids, in other words, the separation is not really completed. In horizontal structure, the competition has not fully launched in competitive links. In the one hand, although the concentration of power generation corporations is low, the price competition is not applied because the only investor is the government. In the other hand, unsystematic laws lead to high barriers to enter or exit and the price inconsistency with historical causes leads to great product difference among Chinese power generating corporations. As stated above, the effects of electricity market structure reform is not in accordance with expectations, the first five power generation groups compete in investment and ca-

capacity but do not save cost and inefficiency. The power grids should be benefited by the scale, but weak investment and security are occurred after the separation between power plant and power grids, the fundamental reason is that the government neither established the price of transmission and distribution nor motivates the power grids link, so the power grids can not make rapid and efficient progress. Based on Chinese vulnerable power grids, low levels of technology and international experience, this dissertation considers that in the future the vertical structure should be required as follows: the separation of power plants and power grids, the separation of transmission and distribution, the limited separation of sales (only very important consumer can be allowed to choose power sellers but common users could not). In chapter five, based on substantial evidence analysis with six indicators, this dissertation considers that the regulation in Chinese electricity market structure has played a positive role in developing economic, reducing business costs, increasing utilization rate of power assets and improving productivity. However, the overall growth of the power industry is not entirely provided by the regulation which leads to the effective allocation of resources. The reason is that the regulation has lagged behind in costs reduction and lacked motivation, which resulted in elements investment distortion, higher costs, lower economic efficiency and lower social welfare. In order to adapt to the new electricity market structure, the regulation should be rebuilding. In vertical structure, the reform should establish a regulation framework under risk management because some risks should occur after the separation of various links, such as power price, power shortage and links coordination. In horizontal structure, the reform should establish a regulation framework under incentive compatibility in order to improve competition and motivation.

The sixth chapter and the seventh chapter provided measures to

optimize the electricity market structure. In accordance with the coordination requirements of vertical links, chapter six designed trade coordination regulation, price coordination regulation and network coordination regulation. According to the requirements of horizontal links, chapter seven designed enter regulation, market power regulation, asymmetric regulation and motivation regulation to improve competition and motivation.

Innovations as follows:

(1) This dissertation considers that the essence of electricity industry reform is market structure reform and market structure regulation is one of the most important aspects to market structure reform.

(2) About the electricity market reform in vertical structure and in horizontal structure, this dissertation considers that risk should be controlled to rebuild vertical structure and motivation should be promoted to rebuild horizontal structure, meanwhile, risk management regulation framework and incentive compatible regulation structure are provided in this dissertation.

(3) Based on current situation, technical constraint and international experience, this dissertation provides strategic model for Chinese electricity market structure and considers that power distribution can not be separated from power sale completely, and the option of common users should be limited.

(4) This dissertation deeply analyzes the basic influence factors of Chinese electricity market structure by substantial evidence analysis and revealed reference for research workers to analyze the current situation.

Keywords: Electricity, Electricity reform, Market structure, Regulation, Motivation regulation, Risk management.

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