

SANWANGRONGHEYUZHENG FUGUIZHI

三网融合与

政府规制

刘颖悟●著



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前 言

电信产业的重组自 20 世纪 90 年代中期启动以来似乎就没有停止过。1994 年，中国联通公司成立。1999 年，对中国电信实施分解式重组，对中国联通实施了整合式重组。同年 8 月，网通公司成立，形成了中国电信、中国移动、中国联通、中国网通、中国吉通、中国铁通、中国卫星通信 7 雄初立的基本格局。两年之后，2001 年 12 月，中国电信南北拆分的方案再次出台。北方 10 省与网通、吉通合并后称中国网络通信集团公司，南方和西部 21 省组成新的中国电信。拆分重组后形成了包括中国电信、中国网通、中国移动、中国联通、中国铁通，以及中国卫星通信在内的 5+1 新格局。2004 年电信产业再次重组的各种传言不脛而走，山雨欲来风满楼，一场新的电信重组似乎已不可避免。与此同时，广电网络也加快了产业化、公司化的步法——网台分离，以省为单位建立企业化的广播电视网络传输公司。2001 年 12 月 18 日，中央级的网络公司——中广影视传输网络公司正式挂牌，之后，中国电子集团入股，于 2005 年初重组为中国有线电视网络公司，半年之后，又重组到中央电视台麾下。但这远非是广电网络重组的终点。

本书正是在通信业不断重组的大背景下，试图解

析三网融合与政府规制的内在规律，为实践中遇到的、不可回避的、必须回答的若干问题寻找答案。比如：三网融合的技术特性和经济特性究竟是怎样的？三网融合对整个通信市场的市场结构有什么影响？三网融合对政府规制提出了什么样的挑战？中国政府应如何应对这样的挑战？电信和广电之间“井水不犯河水”的规制壁垒何时打破？如何在打破这种壁垒时既能顺应三网融合的要求，又能在加入 WTO 后有效地保护国家利益？如何在三网融合的背景下统筹考虑整个通信业的产业重组？如何确定通信市场结构，使得垄断效应和竞争效应获得最佳的匹配？政府采用怎样的规制政策以保持健康的通信市场结构？

当然，要回答这些问题并非易事。本书在写作过程中受到了诸如数据、学识，以及时间和精力等诸多方面的限制，错误和纰漏可能是在所难免的，欢迎各位专家、学者指正。

刘颖悟

2005 年 8 月 1 日

摘 要

数字技术的迅速发展和全面采用,把语音、数据和图像信号编码成“0”、“1”符号进行传输,成为电信网、计算机网和有线电视网的共同语言。所有业务在数字网中都将成为统一的“0/1”比特流,而无任何区别。语音、数据、声频和视频各种内容无论其特性如何都可以通过不同的网络来传输。原先独立设计运营的传统电信网、计算机网和有线电视网正通过各种方式趋向于相互渗透和融合。相应地,三类不同的业务、市场和产业也正在相互渗透和融合。这种现象被称为三网融合。

本书借助于经济学的有关知识和国外通信产业改革的经验教训,综合运用模型化方法、比较分析方法,观察、归纳与想象、直觉方法和系统论方法对三网融合与政府规制进行了研究,在对三网融合进行详尽的技术经济分析的基础上,指出了中国目前三网政府规制存在的问题和改革方向,并提出了面向三网融合政府规制体系、产业重组方案及相应的政策建议,以期对中国现阶段的通信产业改革建言献策,对中国通信产业的健康发展有所裨益。

1. 关于三网融合的技术分析。电信网、有线电视网和计算机网源于数字技术导致的共同数字特性开始走向融合,表现为技术上趋向一致,网络层上可以实现互联互通,业务层上互相渗透和交叉,应用层上趋向使用统一的TCP/IP协议。

三网各自的发展趋势从各自的侧面反映了三网融合的趋势和方向。电信网的发展趋势：网络业务数据化、网络分组化、光纤化、接入的宽带化和无线化等；有线电视网的发展趋势：数字化、宽带化、双向化、光纤化、综合化；计算机网的发展趋势：网络宽带化、业务多样化、高质量、高安全性和高可靠性、由 IPv4 转向 IPv6。Ono and Aoki 模型阐释的从专用平台到非专用平台的转变和从低带宽需求向高带宽需求的转换代表了网络融合的实质和方向。

三网融合的不同发展阶段有着不同的融合技术可行性。在三网融合的初级阶段，电信网通过拨号上网和 ISDN 与计算机网实现了低水平的融合；在三网融合的发展阶段，电信网使用 ADSL 技术，有线电视网使用 Cable Modem 技术，计算机网使用 FTTX + LAN 技术，形成了 512Mbps 至 10Mbps 的接入带宽，三网融合得以实现。但由于三网是面向三网分立设计的，所以此阶段的三网融合在质量、效率和成本等诸方面还存在不尽人意的问題；在三网融合的高级阶段，网络面向融合设计和优化，在任何时间、任何地点可以利用任何接入资源和任何终端实现任何通信类业务，这是三网融合的最高目标。

2. 关于三网融合的经济分析。电信网、计算机网和双向改造后的有线电视网具有很强的网络外部性，整个网络的价值与网络用户数的平方成正比，这种网络外部性可以构成需求方规模经济，再与供给方规模经济相结合，会产生强烈的“马太效应”甚至“赢家通吃”的局面。

电信网和计算机网具有很强的规模经济效应，单向的有线电视网的规模效应弱于前两者，但双向改造后的有线

电视网的规模效应大大增强。

范围经济的存在是促进三网融合的经济因素之一。一种网络经营三网业务的成本低于三网分别经营的成本之和。

成本劣加性表明由一个企业提供整个产量的成本小于多个企业分别生产的成本之和。成本劣加性对于电信网、计算机网和有线电视网来说具有十分重要的意义。实际上，成本劣加性这种经济特性正是三网全程全网的技术要求在经济上的体现。

成本劣加性、规模经济、网络外部性的存在都是对由一家运营商进行全程全网垄断经营可以获得垄断优势和效应的诠释，范围经济的存在又说明构造全业务的运营商可以获得联合经营的低成本优势。但是，如果从动态分析来看，长期的垄断势必使企业缺乏竞争压力，失去降低成本的动机，而竞争会让企业焕发活力，降低成本。三网融合在最难形成竞争的本地网形成了竞争，为引入竞争机制提供了新的契机，因此，三网融合的目标市场结构是在充分发挥竞争效应的前提下，实现寡头数量的最小化。

即使三网融合最终在光纤到户的基础上得以完全实现，在没有政府干预的情况下，也不可能形成唯一的覆盖全社会的网络。罗姆理论用经济密度的概念对此加以说明，指出随着不断向低经济密度地区的入户拓展，边际成本会逐渐上升，最后会出现大客户要建立专网、离开公网的情况。

电信网、计算机网和有线电视网被设计为分别传输冷信息、中等热度信息和热信息，经过数字化和双向改造以后，电信网和有线电视网均能传输不同热度的信息，但有

其相应的经济适用范围，即存在一个信息热度的临界值，低于此值时，经过改造后的电信网更具成本优势，高于此值时，经过改造后的有线电视网更具成本优势。

三网融合的动力机制源自于技术进步、政府放松规制和企业管理创新。数字技术、光通信技术、软件技术、TCP/IP 协议以及宽带接入技术的发展使得三网融合在技术上成为可能，放松和改革面向三网分立的政府规制政策使得三网融合在政策上得到许可，企业的管理创新才最终使得三网融合变为现实。

3. 关于三网融合政府规制。政府规制的目的在于保持稀缺资源的有效配置，避免过度进入引起的资源损失；防止垄断企业凭借有力地位损害消费者的利益和社会福利；确保企业的内部效率，防止企业 X - 非效率；对不充分信息进行补偿，降低得到信息的成本。政府规制的主要内容和手段有：进入和退出规制、投资规制、价格规制、质量规制、普遍服务等。

中国目前对电信网、计算机网和有线电视网的政府规制存在着两个维度的问题：①尚未完成从传统的行政管理向政府规制的转变，主要表现为：政府规制的法律环境存在严重的缺陷、规制者的多重角色、规制权力分散、规制乏力、规制体制不顺、缺乏对规制者的规制、规制方式落后、规制过度与规制不到位并存等；②缺乏从三网分立向三网融合的转变，主要表现为：多重规制者的多重规制体制框架、政府规制的边界和范围面临挑战、政府规制内容需要调整、政府规制程度和方式面临挑战等。因此，中国对于电信网、计算机网和有线电视网的政府规制改革就是要完成这两个转变，建立面向三网融合政府规制体系。

具体内容和政策建议如下：

(1) 建设以《通信法》、《广播法》和《反垄断法》为基础的政府规制法律体系。

(2) 设立面向三网融合的独立政府规制机构。可以有两个方案，方案一是设立“国家通信网络监管委员会”和“国家网络内容监管委员会”，分别对网络运营和网络内容进行规制；方案二是设立“国家通信监管委员会”，同时对网络运营和网络内容进行规制。实施策略上可以先实施方案一，然后再实施方案二。

(3) 允许有线电视网开展互联网业务和基于互联网的 IP 电话业务，同时允许电信网开展基于互联网的 IP 电视业务。在改进政府规制的前提下，将有线电视网纳入整个通信业的调整之中，将中国通信业重组为二至三个全业务公司，以改进市场结构，促进市场竞争，并迎接加入 WTO 后带来的挑战。

(4) 实施不对称价格下限规制可以防止市场份额不对称的企业展开价格恶性竞争，破坏市场的竞争性结构。因此，对中国价格规制的建议是：①首先实施价格上限规制。结束中国长期以来的固定价格规制，代之以既能反映企业成本、又能为企业提供激励的价格上限规制。②根据目前市场结构的状况，有选择地实施价格下限规制。

(5) 在建立和完善成本核算体系的前提下，以长期成本增量法确定电信网间互联使用费；对于互联网的互联互通，一方面对公共交换点（NAP）继续扩容；另一方面 ISP 之间的互联，可以带调整因子的基于流量差的结算模型为结算参考。

(6) 中国应建立多种机制筹集普遍服务金，并以竞标

方式确定普遍服务的运营商。

(7) 针对三网融合，中国应改变目前对内容的多头规制，设立统一的内容规制机构，并对互联网的内容采用宽松的相机规制策略。

Abstract

As digital technology has been fleetly developed and widely used, voice, data, sound or pictures can be encoded into '0' & '1'. All kinds of services in telecommunications network, CATV network and computer network can be converted into streams of bits of '0/1'. There are no essential differences among these streams of voice, data and pictures (or video). That is to say that digital technology allows both traditional and new communication services – whether voice, data, sound or pictures – to be provided over many different networks. Telecommunications, Media and Information Technology sectors are seeking cross – product and cross – platform development as well as cross – sector share – holding. These phenomenon are called 'convergence of three networks (C3N) – telecommunications network, CATV network and computer network'.

The relative knowledge of economics and the experience of reforming information industry in other countries as well as the method of model, the method of comparing, the method of system, the method of observing, inducing, imaging and intuition have been used into research on C3N and government regulation in this dissertation. Basing on economic and technical analyzing on C3N, the existing problems and the reforming directions have been pointed out, the scheme, policy and suggestions of reforming the government regulation oriented to C3N have been well discussed and made.

1. Technical analyzing on C3N. C3N can behave as using the similar technology, connecting on the network layer, infiltrating and

crossing through service, using the uniform TCP/IP agreement on application layer.

The developing tends of each network reflect tends of C3N. The tends of telecommunications network are more digital network services, more packet network, more fiber network, more wideband access and more wireless access, etc; The tends of CATV network are more digital services, more wideband network, more two – way network, more fiber network and more integrated service, etc; The tends of computer network are more wideband network, more integrated service, higher quality of service, higher security, higher reliability, change from IPv4 to IPv6, etc. Being illustrated by Ono and Aoki model, the essential and directions of convergence of network are the change from special platform to non – special platform and the change from narrow-band demand to wideband demand.

Different stage of C3N has different technical feasibility of convergence. At the first stage of C3N, low level of convergence come true by Dial – up or ISDN; At the second stage of C3N, higher level of convergence has achieved by ADSL in telecommunications network, Cable Modem in CATV network and FTTX + LAN in computer network. At the third stage of C3N, the highest level of convergence will come true. Any communication services can be provided in anywhere, at anytime and through any communication resources and by any terminals.

2. Economic analyzing on C3N. Telecommunications network, computer network and two – way reconstructed CATV network have strong network externality. The value of whole network is connected with the square of the quantity of network subscribers in a direct pro-

portion. This network externality that can lead to scale economy at demand aspect, combined with scale economy at supply aspect, will lead to very strong 'Matthew' s effect' or 'Winners keep all'.

Scope economy is one of factors that can improve C3N. The cost of all kinds of services are carried through one of the three network is lower than the sum of the cost of the three kinds of service are separately carried through their own network.

Cost subadditivity means that the cost of providing the whole quantity of products by one company is lower than the sum of the costs of providing the products by several companies separately. Cost subadditivity is very important to telecommunications network, CATV network and computer network. It is economic reflection of the network's technical characters.

Cost subadditivity, scale economy and network externality can explain the benefit of monopolizing a whole network. It is explained by scope economy that the company which operate full services through one network can get advantage of lower cost. But from dynamic views, long term monopoly will lead to lack of competitive stress and motivation of reducing cost. By contraries, competition can give the company vim and vigor, as well as motivation of reducing cost. C3N can make the local network competitive, so the target of market structures of C3N is the balance with maximizing the effect of competition and minimizing the quantity of the oligarchs.

Even if the highest level of C3N come true with accessing by fiber, a unique network cover the whole society is impossible without government regulation. It can be explained by Noam's theory. The lower the density of the area of accessing, the higher the marginal

cost, finally the key clients will quit the public network and build their private network.

Telecommunications network are designed for transmission of 'cold information', whereas CATV network for 'hot information' and computer network for 'middle information'. After digital and two-way restructured, telecommunications network and CATV network can transmit different heat information with different suitable economic scope. There is a critical heat degree of information, telecommunications network are suitable to transmit the information which heat degree is lower than the critical heat degree and CATV network are suitable to transmit the information which heat degree is higher than the critical heat degree.

The drives of C3N come from technical progress, government deregulation and enterprise management innovation. Digital technology, light communication technology, software technology, TCP/IP agreements and wideband accessing techniques give possibility of C3N in technical aspect; Loosening and reforming of government regulation gives allowance to C3N in policy; Enterprise management innovation make C3N practical.

3. Government regulation of C3N. The purposes of government regulations are: keeping efficient scheming of resources, avoiding loss of over-entering, preventing that monopolist get unreasonable benefit from customers and societies, ensuring enterprise efficiency, preventing enterprise X-non-efficiency, compensating non-sufficient information, reducing the cost of getting information. The methods of government regulation include regulation of entering and quitting, regulation of investment, regulation of price, regulation of quality and

regulation of universal service.

Nowadays, China government regulation on telecommunications network, computer network and CATV network exist problems at two dimensionalities: a. Conversion from traditional administration to present government regulation is not completed. This can be indicated by serious lack of legal environment, multi – role of regulator, weak and separate government regulation power, behindhand methods of government regulation, etc; b. Conversion from government regulation on telecommunications network, computer network and CATV network to government regulation on C3N. It can be indicated by the multi – regulation framework of multi – regulator, the challenge to borderline and scope of government regulation, regulating content of government regulation, the challenges to methods and extent of government regulation, etc. Therefore, completing of the two conversions are the targets of reforming China government regulation. The thoughts and suggestions of reforming China government regulation as follows:

(1) Constructing laws system of government regulation based on ‘the Act of Communications’, ‘the Act of broadcasts’ and ‘the Act of Anti – monopoly’.

(2) Setting up independent government regulation organizations oriented to C3N. There are two schemes: a. setting up ‘National Communications Network Committee (NCNC)’ to regulate network operating and ‘National Network’ Content Committee (NNCC)’ to regulate content of network; b. setting up ‘National Communications Committee (NCC)’ to regulate both network’ operating and content. It is suggested that practice scheme a first, then practice scheme b.

(3) Operating internet services and IP phone services by CATV

network and operating IP TV services by telecommunications network should be allowed. While government regulation is improved, CATV network should be concerned in restructuring the whole communication network. The whole communication network are suggested to restructure into 2 or 3 full services companies in order to improve the structure of communication markets and market competition.

(4) Practising anisomerous price regulation with low limit to prevent malignant competition among companies with anisomerous market shares. The suggestions to China regulation are: a. practising price regulation with high limit first, stopping fixed price regulation. b. partly practising price regulation with low limit according to the present market structure.

(5) Using Long Run Incremental Cost (LRIC) to determine connecting fee among telecommunications network, while cost accounting system has been built and improved. To connecting internet owned by different companies, one aspect is to expand bandwidth of NAP, the other aspect is to use the accounting model based on difference of data flux with regulatory factors to serve for accounting among ISPs which are connected.

(6) Building several systems to collect money for universal services and selecting the suitable company to provide universal services by inviting public bidding.

(7) Changing multi-regulation on content at the background of C3N and setting up uniform content organizations to regulate the content of internet with loose policy.