

Head-to-Head or Hand-in-Hand: Does Structural Reform Have Led to Meaningful Competition in China?

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Head-to-Head or Hand-in-Hand: Does Structural Reform Have Led to Meaningful Competition in China?

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Abstract. Standard theory of industrial organization has explained the process of competition development in the setting of a capitalist economy but deals little with circumstances where product market competition is supposed to be among firms who share a single parent of government agency as dominant shareholder. In this regard, the structural reform of Chinese telecommunication industry provides a unique case and test field where operators compete with each other when they are uniformly de facto government-dominated SOEs and are therefore supposed to act in hand-in-hand, rather than head-to-head, manner. Distortions therefore arise as to the market conducts and the market outcome, characterized generally by deviations of firms from profit maximization and of regulators from public interest. While competition is relatively established in mobile and VoIP, traditional wireline segment is still characterized by regional monopoly. Meanwhile, inefficient market conducts are also embodied in interconnection arrangement, duplicate construction, and universal service provisioning, which are also impeding competition development. The interpretation of these conducts relies more on a systematic approach based on consideration of a series of macro- and micro-factors which explains forces of resource allocation as well as incentives toward competition. It is concluded that meaningful and sustainable competition will not come before the establishment of a well-balanced political regime, explicit property system, effective regulatory regime, and ultimately, the general market system.

Keywords: Structural reform; Telecommunications competition; Transitional economy; Institutional economics; China

JEL classification: L11, L96, P31

1. Introduction

Path-dependence reform of China has resulted in an economy growing in quantity as well as in quandary. As the fastest-growing high-tech industry in China, telecommunications has morphed from a traditional utility, paralleling originally with electricity, water, and gas, to a national key strategic infrastructure that accounts for roughly 5.8 % of national GDP¹. Along with this desirable growth momentum, controversy also arises as to:

- Whether economic liberalization with political restraining can really lead a market-driven economy,
- Whether meaningful competition can really take place in an economy with majority state-ownership, and accordingly,
- Whether structural reform in an industry with majority state-ownership such as telecommunications in China can really lead to genuine and effective competition?

The success of market reform lies in the creation of genuine market players who pursue maximum profit under certain budget-constraint. Nevertheless, roughly three quarter of Chinese capital stock is state-owned or -controlled, which means a sibling relationship between SOEs even if market reform is meant to build shoulder-to-shoulder competition. Despite theoretically remains questionable, competition does happen in one area while does not in another in China that has witnessed a miraculous 9% annual growth over the past two decades.

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¹ Data source: Statistics issued by the State Statistics Bureau of China.

Standard theory of industrial organization explains the process of competition development in the setting of a capitalist economy but deals little with circumstances where product market competition is supposed to be among firms of an industry who share a single parent of government agency as their dominant shareholder. In this regard, Chinese telecommunications industry provides a unique case and test field where operators compete with each other when they are uniformly de facto government-dominated SOEs and are therefore supposed to act in hand-in-hand, rather than head-to-head, manner. This has led to numerous regulatory dilemmas and frustrations in Chinese efforts to introduce competition into this sector following the conventional “Structure-Conduct-Performance” paradigm (Mason 1939,1949; Bain 1951, 1956).

Nevertheless, market reform involves systematical changes not only in market structure but also in other economical, socio-cultural, political, and legal aspects that can lead to meaningful changes to market conduct. The purposed of this paper is to investigate the status of competition as well as its underlying forces in Chinese telecom market after fourteen years of structural reform, based on which, to look into the future development of competition in the industry as well as the possible direction of regulatory transition. Case study methodology includes interview with regulatory officials and industrial practitioners, either formally or casually, as well as author’s extensive first-hand exposure to the industry and the economy as a whole.

Paper structure. Part 2 provides a brief historical perspective on the structural reform in Chinese telecom industry and the transition of market structure. Part 3 looks at the status of competition and market conducts in various service markets, including some salient issues in terms of dilemmas in interconnection, wasteful duplicate construction, universal service, etc. Part 4 analyses the systemic approach in interpreting underlying macro- and micro-forces that have been affecting the market conducts. Part 5 looks at the forces of resource allocation and the nature of competition in Chinese telecom industry. Part 6 looks into the possible future development in terms of competition reform in the industry.

2. Structural Reform in Telecommunications: An Overview

2.1. Industry Consolidation

Telecommunications deregulation was incepted in China in 1993, marked by opening up part of the VAS (value-added service) services for competition, and followed shortly afterward by incorporation of China Unicom in 1994. This preludes the beginning of a series of drastic structural changes and governance transition in this industry, which roughly fall into three phases.

First phase signaled by the initial opening-up in 1993 and marked by the entry of China Unicom in 1994. The former Ministry of Posts & Telecommunications (MPT) deregulated in 1993 nine non-basic telecom services which encompass radio paging, 800 MHz trunk telephone service, 450MHz radio mobile communications service, domestic VSAT service, telephone information service, computer information service, electronic mail, electronic data interchange, videotext, and other services at the MPT’s discretion. As a result, many small companies piled into this lucrative market and grew rapidly. The paging industry can serve as an example that was burgeoning into saturation within just a few years. At the same time, the Ministry of Radio Movie and Television was formed to focus on the construction and operation of radio and television network.

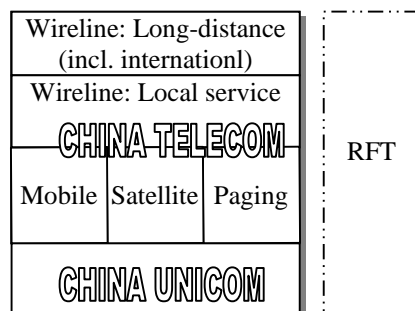


Figure 1. Telecom market structure in China: 1994~1999

Following deregulation, China Unicom was formally incorporated in 1994. The former Directorate General of Telecommunications (DGT) of the MPT was also registered as a company under the name of China Telecom, which was intended by Chinese government as an initial step to separate government function from business operation. At the same time, the Ministry of Radio, Film and Television (RFT) was formed to focus on the construction and operation of national radio and Cable TV networks. This ended up with a duopolistic telephony market (Figure 1), though China Unicom later found that it was actually competing with the regulator. China Unicom is a share-holding company with investments from the former Ministry of Electronic Industry (MEI)², the Ministry of Railway (MOR), the Ministry of Electrical Power, and 13 other large-scale state-owned institutions. As for China Telecom, it did not actually own any networks, let alone provide services. The national network, including three international gateways at that time, were owned and operated by provincial or municipal Posts & Telecommunications Administrations (PTAs) that report directly to the MPT. Therefore, the MPT still assumed a dual status as both regulator and operator. This context had left China Unicom at a very unfavorable position in competing with China Telecom, as it was de facto competing with the regulator, i.e. the MPT.

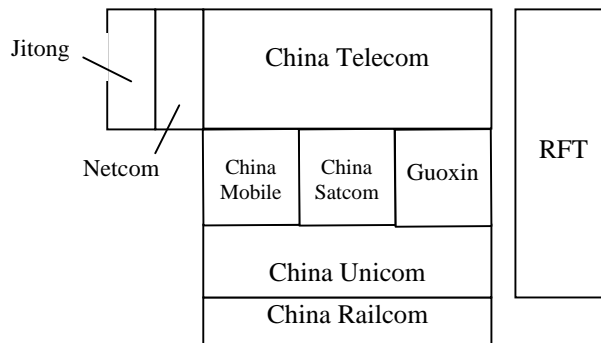


Figure 2. Telecom market structure in China: 2000~2002

This paradox lasted until 1998 when a new round of government reform was launched for further separation of government and business and reinforcing industrial regulation, which signals the *second phase* of telecom reform. To this end, the former MPT and MEI were merged into the Ministry of Information Industry (MII), which was accompanied by the breakup of China Telecom in 1999 into four service-specific companies as well as by the entry of China Netcom, China Railcom, and Jitong. This had culminated in a telecom market featuring seven service-specific companies (Figure 2).

Table 1. Licensees in Chinese telecom market in the year of 2000

	China Telecom	China Mobile	China Satellite	China Unicom	China Railcom	Netcom	Jitong
Wireline: Local	×			×	×		
Wireline: Long-distance	×			×	×		
Mobile		×		×			
Internet	×	×	×		×	×	×
Wireline: International	×					×	
IP Phone	×	×			×	×	×
Satellite			×				

Source: author's research.

In 2000, Chinese government promulgated the Telecommunications Regulations, which is the first industry-specific quasi-law in the history of this sector³. Table 1 indicates license-holding status

² MEI regulates telecom equipment manufacturing industry.

³ In China, only when passed by NPC, can a bill be declared as a law. Since *Telecommunications Regulations* is

of the seven companies in the year of 2000. After China Unicom was licensed to operate wireline network, competition was supposed to take place in almost very service market excluding satellite and cable TV. Competition was still limited, though, largely due to the longtime ambiguity of government-business relations. China Unicom was discriminated or biased against not only by China Unicom but also by the regulator who treated China Mobile as his own “son”.

In 2002, in the aftermath of China’s accession into WTO, the MII issued its ever most ambitious maneuvering as to further break up China Telecom into two companies, i.e. the “South” and the “North”, with the south company inherited the original brand name as China Telecom while the north one renamed as China Netcom that also integrated the former China Netcom and Jitong, which marks the *third phase* of telecom reform. Competition is supposed to take place not only among long-distance carriers but also among local service providers, although inter-modal competition was not an explicitly intended objective then. Figure 3 indicates the new market structure after year 2002.

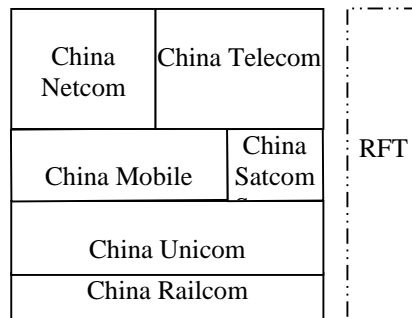


Figure 3. Telecom market structure in China: post 2002

2.2. Market Participants

After a series of divestiture, breakups, and consolidations since 1994, Chinese telecom industry has emerged from regulated monopoly into regulated oligopoly featuring six players, or “Coms”, including three wireline operators (China Telecom, China Netcom, China Railcom), two mobile operators (China Mobile, China Unicom), and one satellite carrier (China Satcom). Table 2 indicates the current status of license holding among the six carriers.

Table 2. Current players in Chinese telecom market (as of August 2006)

	China Telecom	China Netcom	China Mobile	China Unicom	China Railcom	China Satellite
Wireline: Local	×	×		×	×	
Wireline: Long-distance	×	×		×	×	
Mobile	☆	☆	×	×		
Internet	×	×	×	×	×	×
Wireline: International	×	×		×	×	
IP Phone	×	×	×	×	×	×
Satellite						×

Source: author’s research.

Note: “☆” means providing wireless service through XLTs.

At present, all of the six telecom carriers are wholly owned by the state and defined as the “gigantic state-owned enterprises” (GSOEs) that are under direct supervision of the national State-owned Assets Supervision and Administration Commission (SASAC), the state-asset watchdog, whose regulatory functions by definition include:

“...First, it performs the responsibility as the investor, guides and pushes forward the reform and restructuring of state-owned enterprises; supervises the preservation and increment of the value of state-owned assets for enterprises under its supervision, and enhances the management of state-owned assets; advances the establishment of modern

drafted by MII and approved by the President of China, it can only serve by definition as an administrative regulation, which is binding but by definition not a law.

enterprise system in SOEs, and perfects corporate governance; and propels the strategic adjustment of the structure and layout of the state economy. Second, it dispatches supervisory panels to some large enterprises on behalf of the state; takes charge of daily management of the supervisory panels. Third, it appoints and removes top executives of enterprises, and evaluates their performances... Forth, it supervises and administers the preservation and increment of the value of state-owned assets... Fifth and last, it drafts laws, administrative regulations of the management of the state-owned assets and draws up related rules; directs and supervises the management work of local state-owned assets according to law.”⁴

Table 3. Key players in Chinese telecom market (as of December 31, 2005) (in RMB millions)

Carrier	China Telecom	China Netcom	China Mobile	China Unicom
Subscriber (in thousands)	210,094	115,328	246,652	127,794
Revenue (in millions)	169,310	87,232	243,041	87,049
Net profit (in millions)	27,912	20,505	53,549	4,93
Market share	92.5%	92.3%	66%	34.5%

Data source: compiled by author based on company annual reports.

Note: Market shares of China Telecom and China Netcom are their wireline subscribers as percentages of the total wireline subscribers in their respective regions. However, market shares of China Mobile and China Unicom are their mobile subscribers as percentages of the national total mobile subscribers.

Table 3 provides some key indicators of major players in Chinese telecom market. Some refer to the current market structure as “Four plus Two” (or “4+2”), which means the first four largest companies account for majority of the market pie, given limited operating scale of China Railcom and China Satcom. Despite the difference in terms of organizational legacy, service classification and market position, all carriers share some traits in terms of ownership and governance structure:

China Telecom. As a wholly state-owned wireline operator, China Telecom Group Co. Ltd. is officially incorporated in Mainland China in 2002, whose PSTN network originally covers twenty provinces, autonomous regions, or direct-administered municipalities⁵ in southern and western part of China. The group company indirectly holds 70.89% share of China Telecom Corporation Limited (incorporated in Hong Kong), a joint stock limited company established on September 10, 2002, who in turn acquired all subsidiaries in the twenty provinces (regions or municipalities), and successfully completed its global IPO (initial public offering) and got its stock listed simultaneously on both Hong Kong and New York stock markets. As one of two wireline licensees providing wireless service through “XiaoLingTong”(XLT)⁶, China Telecom has succeeded in expanding its subscriber base up to 798.38 millions, quoting from its annual report:

“As an extension of and supplement to our local wire-line telephone service, wireless local access service provides personal communication at an attractive price, thereby enjoying strong demand in niche markets. Wireless local access subscribers reached 57.1 million, representing a growth of 35.4% in total subscribers. The continued decline in the price of local wireless access equipment has made this service a more profitable business.”⁷

China Netcom. Paralleling with China Telecom, another wholly state-owned dominant wireline operator that is based on ten provincial subsidiaries of the former China Telecom in northern part of China⁸ as well as former China Netcom and Jitong, is China Netcom Group Co. Ltd., incorporated also in 2002. Its network originally consisted of PSTN network inherited from former China Telecom and national backbone network from Netcom and Jitong, but has now expanded to some southern provinces including Shanghai and Guangdong, targeting primarily at corporate users. The group company holds through China Netcom Corporation (BVI) Limited

⁴ Source: Chinese central government website.

⁵ They include Shanghai, Guangdong, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Guangxi., Chongqing, Sichuan, Hubei, Hunan, Hainan, Guizhou, Yunnan, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang.

⁶ Or “Little Smart”, a rather obsolete technology based on PHS technology, developed by Japanese firms.

⁷ Source: Company website.

⁸ They include Beijing, Tianjin, Hebei, Henan, Shandong, Liaoning, Heilongjiang, Jilin, Neimenggu (Inner Mongolia), and Shanxi.

70.49% (as of the end of 2005) controlling share of China Netcom Group Corporation (Hong Kong) Limited, a company incorporated in accordance with the Companies Ordinance in Hong Kong on 22 October 1999 who in turn acquired back the ten provincial subsidiaries of the group company and got its stock simultaneously listed both on Hong Kong and New York stock markets on November 16, 2004 and November 17, 2004, respectively.

China Mobile. As the only carrier holding only mobile license, China Mobile Group Co. Ltd was incorporated on April 20, 2000 as a wholly state-owned enterprise who indirectly holds 75.6% controlling share of China Mobile (Hong Kong) Co. Ltd⁹ that wholly owns subsidiaries of the group company in all of thirty-one provinces, autonomous regions, or directly-administered municipalities and got its stock listed simultaneously on both Hong Kong and New York stock markets on June 21, 2000 and June 22, 2000 respectively. It has now become the biggest telecom carriers in China in terms of both revenue and subscribership after the second round of China Telecom's divestiture in 2002.

China Unicom. As the only de jure full-service but de facto mobile operator who owns both GSM and CDMA networks¹⁰, China Unicom Group Co. Ltd (originally known as China United Telecommunications Co. Ltd. when first incorporated in 1994) holds indirectly 77.27% controlling share in China Unicom Limited, a company incorporated in Hong Kong and listed simultaneously on both Hong Kong and New York stock markets since June 21, 2000 and June 22, 2000 respectively. In March 2005, China Unicom (Macau) Limited, a subsidiary of China Unicom Limited, won the CDMA license in Macau and had completed the construction of CDMA network and launched the service in Macau to provide roaming services for CDMA users in October 2005.

China Railcom. Divested from the Ministry of Railroad on December 26, 2000, China Railcom Group Co. Ltd now owns thirty-one provincial subsidiaries across the country and obtains its current name after the supervision responsibility of state-asset of the company was transferred from the MOR to the national SASAC in January 2004. The company was originally meant by the Ministry of Railroad to provide dedicated service within the railroad sector but is gradually trying to expand service and network coverage to the general public. Despite being a wireline licensee, the company has now taken steps in entering mobile market.

China Satcom. Divested from the former China Telecom, China Satellite Communications Company (or abbreviated as China Satcom) was established on December 19, 2001 in China who specializes in the business of satellite communication.

At the present time, Chinese government is drafting its new telecom law, which in a sense, can be an overhaul to the current *Telecommunications Regulations*. In addition, the deployment of 3G (third generation mobile) and full-service operation has been believed by Chinese government to be sources of corporate competence for national telecom industry, thereby a new round of restructuring is allegedly in the pipeline.

2.3. Vertical Integration, Entry Barriers and Consumer Power

Chinese telecom industry is highly vertically integrated and horizontally concentrated. All except China Satcom are vertically integrated where every carrier owns independent inter-provincial backbone network, access network, under-street channels and tubes, or transmission towers. The situation of vertical-integrated network ownership is strengthened in the aftermath of investment boom in fibre backbone networks since 2002. Meanwhile, the industry is highly concentrated as both wireline and wireless markets are dominated either by a regional monopolist or by a dominant carrier.

Substantial entry barriers existed in Chinese telecom industry, particularly in wireline sector, in terms of regulatory restriction, capital investment, network effect, scale economies, and etc. In spite of this, incumbent carriers still enjoy much leeway in deciding whether to enter certain service segments. XiaoLingTong (XLT) is one example where wireline operators managed to bypass regulatory restriction and enter wireless market by launching a network that is interpreted as

⁹ China Mobile (Hong Kong) Limited was directly inherited from the former China Telecom (Hong Kong) Limited, a subsidiary of the former China Telecom for the period of 1997 through 2000.

¹⁰ As of December 31, 2005, subscribership with CDMA network mounted to 32.722 million, representing a 17.6% growth from previous year. *Data source:* company website.

extension of their current networks. On the other hand, as state-owned or -controlled firms, carriers' capital investments or entries are under soft-budget-constraints, which makes entries into certain areas "free". "Free" entry with exit restriction has been one characteristic of state-dominated industry in China.

As a highly government-dominated industry, consumer buying-power can vary across service segments as well as across individuals or groups. Usually, organizational buyers enjoy more bargaining power over individual consumers. In addition, homogeneity of service has led to increased substitutability within a service segment as well as between segments, consumers in these markets can possess more bargaining powers than in those with less substitutability. Usually, wireline market faces less substitution effect from mobile service than otherwise. Consumer power can also be either undermined or promoted by interaction of operators, the exact direction of which depends on historical legacy, socio-cultural differences, as well as the nature of technology.

3. Status of Competition and Market Conducts

Over the past decade, structural reform in Chinese telecom industry has been followed by profound changes in market environment, corporate governance and market conduct of the firms, as well as industry performance. Competition has developed to certain degree in telecom service markets, particularly in wireless market where tariffs and operating expenses has registered constant decline in recently years. National telephone subscriber has reached 798 million (as of July 2006), among which, 366 million are wireline users¹¹ while 431 million are cellular subscribers, which makes national per-hundred-inhabitant fixed- and mobile-phone penetration reach 28% and 32.7% respectively¹². Table 4 exhibits some basic information about the development in Chinese telecommunications industry since 1999, a year marking the beginning of the most recent round of restructuring.

Table 4. Key indicators of industry performance

	2000	2001	2002	2003	2004	2005	2006
<u>Subscriber:</u>							
Wireline	14482.9	18036.8	21441.9	26330.5	31244.3	35043.3	36659.7
Mobile	8453.3	14522.2	20661.6	26869.3	33482.4	39342.8	43179.9
<u>Penetration:</u>							
Wireline	8.65%	14.46%	17.55%	21.2%	24.9%	27.0%	28%
Mobile	6.77%	11.44%	16.19%	20.9%	25.9%	30.3%	32.7%
Revenue	3014.15	3719.14	4115.82	4610.0	5187.6	5799.0	N/A
ARPU	135	123	94	81	76	71	N/A

Data source: compiled from statistics issued by MII at <http://www.mii.gov.cn/>

Note: Data for 2006 is for first two quarters.

Along with these favorable momentum in terms of enhanced service availability and generally reduced prices, however, a number of restraining forces rooted in current political, socio-economic, and technological configuration are still blurring the landscape of competition, which adds much uncertainty to the prospect of market development in this sector. Part of the evidence can be found in those exhibited in the difficulty in interconnection, duplicate network investment, as well as the provision of universal service. In addition, market power in wireline local market is still substantial, which makes it probable for wireline operators to extend their monopoly position in local markets to long distance markets as well as to XLT markets.

3.1. Competition Development in Service Market

Structural reform was meant by Chinese government to bring competition into every market including traditional PSTN (wireline and wireless) as well as Internet except for radio and television that are treated as critical propaganda mass media. Nevertheless, the span of past decade has registered unbalanced development of competition in different market in terms of change in

¹¹ The figure of "wireline" users here is inclusive of wireless users subscribed with the XLT networks that are classified by MII as "wireline" for regulatory convenience.

¹² Source: http://www.mii.gov.cn/art/2006/07/24/art_27_19868.html. The penetration data used here is that of year 2005.

tariffs, characterized generally, by relatively intensive price rivalry in wireless voice service while moderate rivalry in wireline telephony. Despite competition in Internet access, particularly broadband, is developing at a favorable speed in recent years, it is still at an early stage in terms of both limited subscriber base as well as relatively high price.

3.1.1. Mobile Competition

Rivalry in mobile market can date back as long as a decade ago when China Unicom was first incorporated, and the scope of the rivalry can range from commercial to sentimental. China Unicom was materially underprivileged by China Mobile (which was part of China Telecom before 1999) who enjoyed substantial competitive advantage derived from its intimate relation with the regulator (MPT) at an early stage of the structural reform. Tension between the two companies, both at business and interpersonal levels, therefore developed, as staffs from executives to floor workers from the two companies hold a somehow hostile attitude toward each other at the early time, which makes cooperation less likely to happen. This legacy of rivalry was not alleviated whatsoever until the divestiture of China Mobile from former China Telecom in 1999 and mandatory top executive switch among dominant carriers executed by the SASAC in 2004.

Carriers' belief in market environment and the low-price entry of XLTs has led to a relatively competitive mobile market, characterized by intensive price competition, or "malicious price war" as Chinese carriers put it, which was ignited shortly afterward the second round of divestiture and consolidation in 2002. Facing pressure from job-approval raters in market expansion, branches of the two mobile license-holders engaged in seesaw tit-for-tat price war to recruit new customers in the hope of sustaining growth. Specific tactics at the early stage can be offering low initial access charge but were later on upgraded to more aggressive ones including free initial access, tariff discounts, free terminals, free monthly fee, and network-in-network package-service-plans¹³. Price competition reached a major proportion in the year of 2002, as one of the media coverage on "price war" of the time put it:

"...Price war was triggered in some relatively remote areas and then expanded like plague in all directions... In some extreme cases where business competition has been escalated to such an extent that it is simply mimic of warfare, rooms of a carrier branch's office building were marked as "Field Battle Office", "Office of Intelligence", "Commander-in-Chief", and so on... Competition is no longer merely for business purpose but has reached such a frenzy state that interpersonal offensive happens once in a while..."¹⁴

Most recently, package-service-plan¹⁵ is becoming popular a pricing strategy by carriers who differentiate against different market niches. Tariffs of both wireless local and long-distance services have reached a record low in middle 2006 when the dominant mobile operator China Mobile began to offer highly discounted rate to its "Go Tone" subscribers¹⁶, usually composed of heavy users of the firm. Before this, the company's practice of package-service-plan targeting at its "Go Tone" market can date back to as early as 2004. The tit-for-tat price war between two mobile operators, and between XLTs and mobile operators reached a new high since the turn of 2005¹⁷.

¹³ "Network-in-network" is de facto a kind of low-priced virtual dedicated network service licensed by MII to service organizational users but was abused by carriers for the purpose of signing-up individual consumers.

¹⁴ Source: "Price war, stop!" Beijing: People's Posts and Telecommunications (in Chinese). The article was accessed on August 14, 2006 at <http://www.cnii.com.cn/20020808/ca77897.htm>

¹⁵ It is a matter of fact a variation of two-part-tariff, which is regarded by carriers as a hidden tactic that may conceal the actual level of per-minute rate that is required by rules to be not lower than a certain level.

¹⁶ Go Tone is one of China Mobile's brand names that provide international direct dialing and roaming service to those customers with high MOU and willingness to pay, and usually offered at a premium rate. China Mobile Beijing Company, for example, launched a package-service-plan to its "Go Tone" subscribers in June 2006 to offer a remarkably lowered rate that is equivalent of roughly RMB 0.2 per-minute-rate for local call. Source: company website at <http://www.bjmcc.net/>. Accessed on August 14, 2006.

¹⁷ For example, several aggressive interactions of price change between China Mobile Beijing branches (Beijing Mobile, or BM) and China Unicom Beijing branch (Beijing Unicom, or BU) made a new breakthrough in shaking the general level of voice service tariff in this country. The crusade was ignited by BM who launched in January 8, 2005 a new "12593" package-service-plan with very attractive rate targeted at its ShengZhouXing users. As a

Until 2005 when MII started to exercise price cap regulation¹⁸ on domestic long-distance telephone service as well as mobile telephony domestic roaming charge, price of wireless telephone service was subject to government directed-pricing regulation, which set a per-minute-rate of RMB 0.4 and RMB 0.6 respectively as benchmarks for pricing mobile telephony local and domestic long-distance services. There are generally three types of pricing policy as stipulated by MII rules:

- *Government pricing,*
- *Government directed-pricing,* and
- *Market-oriented pricing.*

Although mobile voice service was classified as basic service that is by MII rules subject to directed-pricing regulation, carriers still manage to cut their price way below the directive price via some indirect pricing methods such as package-service-plan, through which, mobile users can acquire certain amount of “free minutes” by paying a fixed-fee, which is normally far lower than if charged on per-minute basis.

Another driving force that has been furthering mobile competition comes from XLTs that is classified by the regulator as wireline technology, and consequently, “wireline service”. As extension of wireline network, XLTs penetrated wireless voice service market at an attractively low rate, primarily targeting at lower-end users who are more price-sensitive. Facing saturating local wireline voice market in terms of recruiting new subscriber, wireline carriers take XLTs as a new engine of business growth and therefore adopt a more aggressive pricing strategy, which is backed by monopolistic wireline infrastructures that can cross-subsidize service in relatively competitive wireless market.

As a dominated player in conventional mobile sector, China Unicom’s market position is squeezed by XLT flanked from low-end segment and China Mobile from high-end. Due to limitation in branding and network infrastructure as compared with China Mobile, the company has long been perceived as a market follower in conventional mobile market and has to target at low-end users with lower ARPU. Table 5 provides a comparison between China Unicom and China Mobile in market share, profitability, ARPU, churn-rate, etc. This situation will sustain in the foreseeable future before China Unicom manage to overcome network effect and restructure the profile of its customer base.

Table 5. Market position: China Unicom vs. China Mobile (as of December 31, 2005)

	Market share	Profit margin	ARPU (in RMB)	Churn rate
China Mobile	66%	21.8%	90.0	1.87%
China Unicom	34%	3.5%	48.5	28.9%

Data source: author’s calculation based on company annual reports.

Note: (i) Data for China Mobile is blended while data for China Unicom uses GSM statistics except for profit margin. (ii) Profits are after tax net profits.

Price war among mobile carriers has been drawing extensive attention from relevant government agency that worry about growth of the value of state-asset that is suspected threatened by carriers’ aggressive pricing strategy. Despite as early as 2003, MII issued a suggestion¹⁹ in collaboration

response, BU reacted promptly to launch an attractive “Combination of local and long-distance” package-service-plan to its RuYiTong users, which belongs to same market as ShengZhouXing. Five month later, BM launched an even more aggressive promotion campaign in the end of June, 2005 through three specific actions, i.e., “Rebate for prepay of ShengZhouXing”, “Discounted rate for M-Zone”, “Prepaying 600 for rebate of 300 for Go Tone”. BU responded by declaring on July 24 and July 25, 2005 respectively the general price cut for its “Combination of local and long-distance RuYiTong” and “Tariff rebate RuYiTong”. Closely following BU’s footstep, BM reacted by declaring a more privileged rate for its ShengZhouXing users located in suburban areas, which in turn, is followed by BU who declared within only one day to lower the rate of its “Up-XinShiLi” brand. *Source:* See Liu, Y. Suggestions on the price competition and strategy of mobile voice services,” Beijing: *World Telecommunications*, 2, 2006. (in Chinese)

¹⁸ MII issued in collaboration with SDRC in September 2005 the “Notice on Changing Price Regulatory Rule for Some Telecom Services”. This for the first time reversed the longtime philosophy of telecom regulation from price floor to price ceiling, which is regarded by some as a sign of initial step toward overall marketization in the industry.

¹⁹ The full title of the suggestion is “Suggestions on Further Enhancing the Enforcement of Telecom Regulation.”

with other five ministries on curbing intensive price war among mobile carriers, the practice of aggressive pricing appears not to be affected whatsoever. Conversely, rivalry in wireless telephone market was even intensified, which has led to continuously decreased tariff several times lower than the regulated per-minute-rate of RMB 0.4 and increased availability of mobile service.

3.1.2. Wireline Competition

Compared with mobile market, there is relatively less rivalry in wireline telephony market, particularly in local telephone market where nominal price has generally increased rather than decreased over the past decade. If in national-average term, the price of wireline local telephony has become higher than that of wireless local telephony, reversing from what it was before 2004. This is primarily due to the fact that divestiture of wireline network has not resulted as expected in adequate local competition, as both China Telecom and China Netcom are still local monopolists in their respective regional markets. Despite substitution effect, if any, from mobile market may constrain their abilities of pricing, however, local access network was less substitutable than long distance at this stage due to technological as well as some behavioral constraints²⁰.

Nevertheless, wireline long-distance telephone service faces more rivalry from mobile sector, VoIP providers, as well as from within the sector, which generally makes long-distance telephone market in China more dynamic and competitive than any other segments of the industry. Since substitution effect between wireless and wireline in long-distance telephony can be more significant than that between wireline local loop and wireless network, wireline operator therefore enjoys less market power in its long-distance market as compared with its local telephone service.

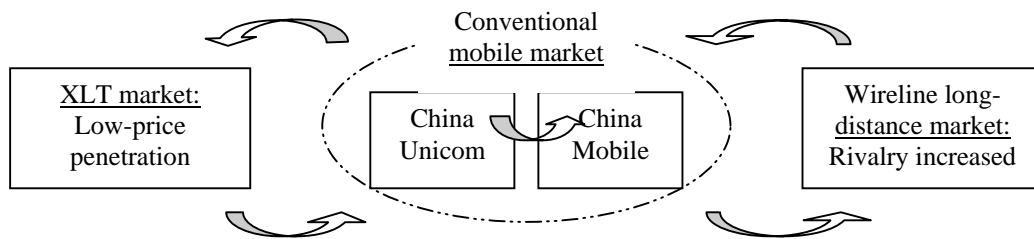


Figure 4. Competition chain and wireline-wireless interactions

Note: Arrows mean the relationship of competition or interplay.

The dynamics of long-distance market can be illustrated in Figure 4, where a competition-chain is identified, which can partly explain the status of competition in this market. Long-distance telephone market can be identified as consisting of four segments:

- *XLT long-distance service providers* (China Telecom and China Netcom),
- *mobile license-holders* (China Mobile and China Unicom),
- *conventional wireline long-distance carriers* (China Telecom, China Netcom)²¹, and
- *VoIP providers* (all of the six carriers).

The competition-chain in Figure 4 starts with XLT market where wireline carriers try to sustain growth by penetrating wireless market through low-price strategy that is backed by their monopolist position in wireline local loop, which ends up with more rivalry in mobile market. VoIP is not included in the chain, though, as it is treated as exogenous because of its low incremental cost and excessive sunk capital investment. Facing competition from XLT's aggressive pricing and exogenous low price of VoIP, China Mobile and China Unicom are losing market powers. This rivalry in wireless market can also be intensified from substitution effect with

Apart from MII, the other five ministries are State Committee on Development and Reform, Ministry of Finance, Ministry of Supervision, Organization Department of CPC's Central Committee, and SASAC.

²⁰ Conventional telephone line enjoys some unsubstitutable feature that current mobile technologies cannot offer, e.g. fax, dialup networking, or xDSL broadband Internet access, etc. In addition, sometimes a consumer may prefer to have a telephone line installed simply out of consumption habit.

²¹ Although VoIP service and China Railcom is not included in the model, it is believed that it does not affect the result.

conventional wireline long-distance voice service, which would in turn lead to reduced market power of wireline operators in long-distance service market. In this sense, the introduction of XLTs by wireline operators has de facto created their own rivals in both local and long-distance markets.

Evidence of relatively lower rivalry in conventional wireline market can also be found by comparing company's expenditure in sales and marketing efforts with that in mobile segment. Table 6 compares between wireline and mobile sector in terms of expenditure in sales and marketing as percentage of revenue over the year of 2003 to 2005, from which it can be seen a relatively higher expenditure by mobile sector.

Table 6. Expenditure in sales and marketing: wireline vs. mobile (As percentage of revenue)

Year	2003	2004	2005
Wireline	12.96%	12.98%	14.34%
Mobile	30.00%	30.23%	27.86%

Data source: Author's calculation based on company annual reports.

Note: The percentages are weighted averages based on total revenues of firms.

Market share in terms of wireline subscribership is high on regional basis. Apart from very limited entry into each other's territory, China Telecom and China Netcom still hold more than 90% market share in terms of wireline subscribership in their respective regions²². By comparison, there are more than two service providers in every regional mobile and VoIP market. Despite market share in a single service segment alone may not be strong enough to predict market power in wireline industry, however, it might be meaningful if taking into account the factors that:

- *Entry barriers.* These barriers, particularly in wireline sector, come from regulatory restriction, capital investment, network effect, scale economies, and etc.
- *Homogeneity of service.* Homogeneity in consumption and convergence in production can lead to higher price elasticity in mobile that that in wireline market.
- *Interaction of operators.* Collusion can be easier to happen between wireline operators than between mobile operators due to regulatory legacy as well as geographic reason.
- *Less substitutability.* Wireline service face less substitution effect from mobile service than that faced by mobile service from wireline service.

Wireline carriers have committed substantial capital investments in building XLT networks, particularly since 2004. Nevertheless, it is more difficult to implement accounting separation regulation under current regime in China, expenditure in building and operating XLTs are sometimes bundled with conventional wireline networks. The nature of this type of expenditure is treated similar to the shared and common cost, which is unreasonably amortized among regular wireline services. Price-cost margin could be even higher if separating the effect of XLT on general cost level of wireline operation.

The fact that wireline sector exhibits more market power than mobile sector in general does not necessarily mean that particular mobile carrier cannot enjoy substantial market power. Conversely, as the dominant carrier in mobile sector, China Mobile can also enjoy substantial market power over China Unicom and XLTs, where the later can be treated as competitive fringes given their market share as well as technology. China Mobile's market position is further strengthened in the absence of number portability. In another words, while wireline may have lower level of rivalry in industry level as compared with mobile industry, China Mobile can still enjoy substantial market power within mobile industry. Although in practice the assessment of market power may rely on sophisticated market definition, going into detail is beyond this paper's purpose.

If taking an even more general perspective, overall price-cost margin can be higher even if in mobile industry, considering Chinese telecommunications industry has in general sunk unreasonably substantial amount of capital investment in duplicate construction of independent networks, the expense of which has to be depreciated and amortized on current services (the topic of duplicate investment is discussed in detail later in this paper). In this sense, competition in Chinese telecommunications market is generally not adequate, dominant carriers, either wireline

²² Data source: company annual reports.

operator or mobile operator, can enjoy substantial market powers in terms of their ability to price over cost.

3.1.3. Broadband and VoIP

Competition in broadband Internet services is developing over the recent years, particularly after 2002. The number of dialup users is generally declining while the number of broadband users increasing, particularly ADSL subscribers, now totaled nationally at 76.5 millions²³. The prices of Internet services have witnessed steady decline in recent years, largely due to increased rivalry from multiple market participants. Nevertheless, two traditional wireline operators still enjoy substantial market power in ADSL accesses because of their monopolist position in wireline local loops. In general, competition in Internet access is still in early stage, primarily due to availability of terminals, knowledge as well as consumption pattern.

VoIP has been one of the fastest growing service segments in China. Minutes of usage in VoIP now account for more than half of total long-distance minutes. Backed by independent national backbone fibre networks, operators (either wireline or wireless) have engaged in intensive competition, which has led to a price generally much lower than that of conventional long-distance services. In spite of this, further price cut will depend on carriers' usage of their national fibre networks, considering only about 10% of the total capacity are now used. Price decline due to excess supply can be material, which appears to be common knowledge among carriers, as carriers are aware of the fact that competitive advantage via undercutting competitors cannot be sustainable because it not only is easy to copy but would trigger more rivalry in traditional voice market as well. A conscious parallel or tacit collusion is therefore formed where carriers are happy to keep the total length of 4.3 million kilometers of fibre backbone networks "black".

3.2. Wholesale Market: Dilemmas in Interconnection

One characteristic of telecom industry is competition in retail (service) market while cooperation in wholesale market (interconnection). Interconnection has been key to effective competition under a deregulated telecom market. Therefore, mandatory interconnection requirements can be found in many international treaties as well as national regulations and laws. The 4th Protocol of GATS Reference Paper stipulates that:

"Interconnection with a major supplier will be ensured at any technically feasible point of the network. Such interconnection is provided...(a) under non-discriminatory terms, conditions...(b) in a timely fashion, on terms, conditions and cost-oriented rates that are transparent, reasonable, having regard to economic feasibility, and sufficiently unbundled...(c) upon request, at points in addition to the network termination points offered to the majority of users, subject to charges that reflect the cost of construction of necessary additional facilities."²⁴

China's *Telecommunications Regulations* also institutes that "[D]ominant telecom carriers should not decline interconnection request of other telecom carriers or dedicated network operators."²⁵ The regulation has improved the condition of interconnection to certain degree, however, the status of interconnection in Chinese telecom market, is still problematic with a number of undesirable conducts:

- *Postpone to interconnecting*. Carriers, normally dominant wireline network operators, are less willing to interconnect with others. Although this usually appears to happen in early stage of the structural reform, some services are still not interconnected among relevant carriers at this stage, toll-free number "800" is one example where mobile users still cannot access the service by using their cell phone.
- *Interconnected by not communicated*. Since explicit refusal to interconnection may draw government intervention as well as public attention, dominant carriers choose to be less

²³ Data source: MII

²⁴ See Term 2 of the WTO Reference Paper.

²⁵ See Term 17 of Chapter 2, *Telecommunications Regulation*. In addition to stipulation of the *Regulation*, there is still another regulatory rule "*Regulation on Interconnection between PSTN*" that is specifically focused on interconnection regulation.

cooperative in making their networks actually communicating even though they are physically connected with other networks²⁶.

- *Communicated but not well.* Carriers can sometimes deliberately impede the smooth communications in their interconnecting points either by maliciously changing the program and data²⁷ or simply by sabotaging network infrastructure²⁸, which would end up with either lowered quality or simply unavailability of service to customer who wants to make inter-network communication.
- *Non-connection between applications.* As a trend in recent years when government intervention into interconnection matter has become intensified, interconnection difficulty tend to take a more hidden form, focused primarily on application layer, e.g., interconnection is difficult between applications such as “virtual networks” and SMS rather than between physical networks.

Carriers’ motive in unwillingness to interconnect, by economic principle, can also be a rational private choice. For example, a dominant network may be less willing to interconnecting with smaller networks due to positive network effect. Nevertheless, in Chinese telecom market, there are yet some other reasons behind carriers’ interconnection behavior, which may include:

- *Competition for market space.* Interconnection means availability of communications among users subscribed with different networks. In a network market where controlling or dominance generally outweighs cooperation or co-petition, interconnection can be more difficult to take place, particularly when carriers and their branches are facing competitive pressure in building market share. Meanwhile, competitions for market space are sometimes de facto out of personal influence of executives²⁹.
- *Low regulated access charge* Interconnection charge is subject to directed-pricing regulation that is supposedly low³⁰, which means incentive incompatibility for dominant carriers to interconnect³¹. The most serious interconnection issues often happen between wireline and wireless operators where the former usually claim the proportion of access charge on their total revenue is too low (See Table 7 for data)³².
- *Competition of personal influence.* As mentioned above, competition is sometimes about personal influence of individual or group of individuals. In this sense, holding other things constant, interconnection is supposedly easier to happen between two networks whose management are in good terms or where there is less rivalry, and vice versa.

Table 7. Revenue from interconnection of major carriers (as percentage of total operating revenue)

Year	China Telecom	China Netcom	China Mobile	China Unicom*
2005	7.6%	7.5%	6.8%	6.7%
2004	6.6%	6.5%	5.6%	5.5%
2003	5.5%	5.4%	4.8%	4.7%

Data source: compiled by author from company annual reports.

* The data is for its GSM network.

²⁶ Interconnection problem in physical layer has not been alleviated until March 2001.

²⁷ The trick of obstructing transmission by maliciously changing program and data can be more hidden that is more difficult to track but easies to recover.

²⁸ Over the period of 1998~2004, there are totally 600 cases of malicious interconnection sabotages directed to MII, which affected millions of telecom users. Source: Wang, Weimin, “Telecom regulation comes to the frontier, sabotaging telecom network can be subject to as high as 7 years of imprisonment.” Beijing: China Telecommunications Trade, January 17, 2005. (in Chinese)

²⁹ Chinese government regularly switch cadres at different levels for fearing of the formation of personal spheres of influences by cadres whose terms in certain positions are too long. Source: See document of Organization Department of CPC central committee, “Regulation on Switching of Cadres”.

³⁰ The regulated access charge in China is price-based where access charge are set to account for 15% of local service rate, which means RMB 0.06 in per-minute term to be paid by mobile operator to wireline operator for local access given a local mobile rate of RMB 0.4 per-minute is applied.

³¹ Interconnection issue is more serious in connecting with local wireline network owner who still enjoys substantial market power even after the second round of structural reform in 2002.

³² Wireline operators have long been complaining about low access charge and appealing for a change. In 2002, revenue from access charge by China Telecom and China Netcom account for only 3.6% and 3.3% of their respective operating revenues, comparing with 10%~20% international level at the same period.

In most cases where interconnection disputes arise, when being unable to receive constructive responses from industry regulatory agencies at relevant levels, the injured parties would try to bring the case to local courts where they are without exception declined³³. Guilty parties involved in interconnection disputes are usually aloof and indifferent toward possible regulatory actions, as these corrective actions, if any, are mostly lenient and unbinding that usually means a trivial loss in the form of a fine³⁴. Lenient regulatory actions, combined with the absence of appropriate intervention from regular court system given current jurisdiction arrangement, has been misleading dominant carriers in interconnection decisions. Interconnection has since become a hot regulatory issue that receives could regulatory reactions.

3.3. Network Deployment: Duplicate Construction

Contrary to countries elsewhere who are normally struggling in establishing facility-based entry in local telecom market, China has witnessed a rapid and large-scale growth of capital investment in network infrastructure since the second round of structural reform in 2002, which culminates in six nation-wide inter-provincial fibre backbone networks (exclusive of RFT's network). Mirroring investment boom in wireline and cable, mobile operators show no reservation in building their independent base stations with their own transmission towers, and digging their own tunnels with their own tubes. Table 8 is annual national total of capital investment over the year 2000 to 2005, from which it can be seen that national annual capital investment stood steadily above RMB 0.2 trillion.

Table 8. National annual total of capital investment: 2000~2005 (in RMB billions)

Year	2000	2001	2002	2003	2004	2005
Capital investment	222.4	255.3	203.5	221.5	213.7	203.3

Data source: MII

As of 2006, the national total length of fibre cable built by six telecom carriers has reached 4.3 million kilometers, costing about RMB 150 billion, while the general utilization rate ceased roughly at 10%; base station has totaled 350 thousand, belonging to China Mobile and China Unicom respectively. All of a sudden, many roads in the country are lined with overhead cables, the underground streets in metropolitan areas are jammed with tunnels and cables, even in some small towns with population numbered only in the hundreds, one can still see two towers paralleling aloft with each other, as former President of China Unicom observed in one of his research trips:

“...Even on a tiny bridge in Foshan, Guangdong Province, one can still find congested four lids covering four tunnels belonging to local operators... In our trip from Yanan to Yanchuan, Shan’xi Province, roads are lined with four to five lines of posts paralleling along, which respectively belong to China Telecom, China Unicom, China Mobile, China Netcom, RFT, etc... The already shrinking land area of farmers’ is scattered with telephone-cable posts. This has caused much inconvenience for cultivating activities...”³⁵

The zest of Chinese telecom carriers in network deployment reminds one of the early years after AT&T’s patent expiration in 1893 when America saw “a profusion of small and large telephone companies, resulting in a jungle of overhead lines in many of America’s cities.”³⁶ Since every

³³ For one example, in 2003, China Telecom Jiangsu branch brought its suit against Jitong Jiangsu branch to a local court for the impeachment of the later on failure to pay interconnection charge of RMB 10 million. Another example is China Unicom Hainan branch vs. Chian Telecom Hainan branch. As plaintiff, the former brought the lawsuit in August 2003 to a local court, claiming that the defendant refused to provide interconnection as stipulated by the *Telecommunications Regulation*. The applications of two suits were all declined by local courts.

³⁴ According to *Telecommunications Regulation* (Term 73) and its addenda, applicable fine in an interconnection dispute ranges from RMB 50 thousand to RMB 500 thousand, a sum merely negligible to almost all carriers and their local branches.

³⁵ Source: Yang Xianzu’s remarks at the China People’s Political Consultative Congress (CPPCC) held in Beijing in 2005.

³⁶ Source: ITU, Competition policy in telecommunications: The case of the United States of America (prepared by John Alden), Workshop on Competition Policy in Telecommunications, Document: CPT/05, Geneva, 18 November 2002.

carrier would choose to build its independent network, roads of most medium and large cities in China are jammed underneath with multiple-lines of underground tunnels, including those for the purpose of utilities such as gas, water, and electricity. According to estimate, money wasted due to duplicate construction in telecommunications alone has reached in the billions, a number equivalent to the total expense of building several “Three Gorges Projects”. Although this paper does not mean to go into technical detail, a preliminary calculation would probably suggest that certain degree of wastefulness does exist in the network deployment boom. Table 9 indicates the assessment of loss due to wasteful duplicate construction.

Table 9. Losses due to duplicate construction (in RMB billions)

	Backbone network	Access network	Tunnel	Transmission tower	Total
Expenditure	150	250	50	72	522
Waste	128	150	30	24	332

Data source: author’s calculation. Data in this table does include RFT network.

Note: The assessment of loss is based on the assumption that: (i) one third of transmission towers should be co-built between China Unicom and China Telecom; (ii) 85% of investment in inter-provincial backbone fibre network is wasted; (iii) two, or three at most, access networks are adequate for a given regional market; (iv) expenditure in tunnel construction is based on author’s estimation.

Probably it appears to be jumping into conclusion about the status of duplicate construction before taking a look at the production technology and market condition of telecommunications in China. Economic principle argues that the subadditivity of cost function is a necessary condition for natural monopoly. As networked industry, telecommunications is typically characterized by supplementarity of network components as well as substantial scale economies. Despite over the past decades technological development has led to profound change in production technology of telecommunication, particularly in areas of wireless communications where economies of scale is becoming less relevant than before in planning production process, generally, wireline technologies still exhibit substantial increasing return on scale, which makes some elements of the network bottlenecks to new entrants. Therefore, subadditivity of cost, at least in some parts of telecom network, may warrant public intervention in restricting entry so as to promote maximum social welfare on the one hand, the introduction of competition, however, can also lead to decreased price and increased consumption variety on another. Meanwhile, regulatory cost can be substantial in regulating an industry like telecommunications while competition may serve the same ends at minimum regulatory efforts. Society is therefore confronted with trade-off between these two sides of the effects.

In China, duplicate network deployment can probably be argued as facility-based entry where carrier sustains or expands its service coverage by investing in its own infrastructure, which results in a vertically highly integrated while horizontally highly concentrated network ownership. The implication of it is probably not that black and white, though. First, the number of networks may be so many that scarce resources are wasted due to excess capacity. Second, the status of competition may be improved under a larger number of facility-based carriers. Third and last, regulatory efforts required may supposedly be reduced as compared against an unbundling policy, as regulator’s primary responsibility is now to make sure the networks are interconnected.

Some argue that, to gauge whether there existed wasteful duplicate construction in Chinese telecom sector, one has to first look at corporate ownership structure of the firms, on the ground that since all telecom carriers share one single majority shareholder, i.e., Chinese government, it can therefore be concluded that investing independently in respective vertically integrated network is a sign of wasteful duplicate construction. Nevertheless, shared majority-owner alone cannot be a criterion for the judgment of this purpose, since the very intension of Chinese government in restructuring telecommunications is bringing into competition by creating multiple relatively independent market participants. Looking at the capacity alone cannot lead to the conclusion of wasteful investment either, as from a more dynamic point of view investing in excess capacity can be used by carriers as strategic commitments, particularly when this can lead to a Bertrand market where social welfare is to be promoted under intensified price rivalry.

It appears that one criterion for assessing the warrant of independent integrated network construction in China is to assess how this will contribute to meaningful competition. To this end,

there are two sides need to be compared, i.e., social gain through increased competition versus social loss due to excessive duplicate capacity. Empirical investigations have arguably suggested a positive correlation between the number of firms and the degree of competition. One interesting study by [Bresnahan and Reiss \(1991\)](#) on entry and competition in five highly concentrated service industries finds that competition produced by the entry of first two additional firms can lead to substantial change in market behaviors whereas further entries can only have trivial effect on rivalry since price-cost margin has already been reduced by the entry of the second and third firms. Therefore, if taking into account of the trend of convergence and the extremely low utilization rate of network, it could be less risky to say that the total number of seven (inclusive of RFT) independent vertically integrated national networks in China is probably too many.

While it is probably hard to assess the wastefulness in backbone network and access network in China, evidence appears to be more palpable in duplicate wasteful investments in tunnels, tubes, and mobile base stations. It seems to be difficult for Chinese telecom operators to cooperate in interconnection as well as collocation in network deployment, particularly in regions where competition become more intensive. Carriers tend to invest in their own tunnels, tubes, cable posts, and transmission towers, which have cost billions worth of scarce financial and physical resources. Meanwhile, due to lack of explicit urban planning in terms of civil engineering, it is often the case that some roads are repeatedly torn open. Private rationales behind carriers' behaviors in infrastructure construction in China can be multifold:

- *First and primarily*, firms want to be less dependent on market and try to acquire adequate control of its production process. Investments in independent networks can be interpreted as firms' vertical integration activities where every network component is an industry that is complementary with others.
- *Second*, network expansion in China can also be interpreted, at least partly, as contest of personal influence between managements of different operators in which they enjoy controls.
- *Third*, firms want to sustain in the play field in the imminence of perceived future industry reorganization. By investing in a complete network, they would probably be less threatened by being merged.
- *Forth and last*, from a more technical perspective, frustration in securing interconnection with other operators can also be a practical reason for integrated network ownership.

Duplicate construction in China can give rise a number of problems, although the exact nature of the consequence is subject to further quantitative and/or qualitative enquiry. Even if regardless of possible waste of resources (monetary or physical) directly resulted from duplication, another more serious consequence is that this would probably pose as impediment to further regulatory reform as well as to the deployment of new technology. Since the number of seven fully integrated national networks is by experience too many in the next generation network, restructuring is imminent in the era of 3G, which would mean more complexity in dealing with the existing duplicated facilities. Despite duplicate construction may be taken as **entry condition**³⁷ in China, which is favorable to market competition, however, this may also lead to increased market power of individual firms in terms of the scale of fixed-cost committed. In addition, meaningful competition cannot take place without effective interconnection arrangement even if the industry has multiple vertical-integrated networks.

3.5. Universal Service and Cross-subsidization

Along with structural reform in China, universal service issue also arises. While telecom industry has been witnessing exponential growth over the last two decades, however, digital divides are now broadened among varied groups, particularly between urban and rural areas, which poses as the "Fourth Gap" in addition to the conventional "Three Gaps"³⁸.

³⁷ Soft-budget-constrained investment in China can probably be taken as equivalent of entry condition, as a firm's budget constraint is soft when making entry decision. In this sense entry is "free". Soft-budget-constraint of Chinese SOEs has lead to duplicate investment or excess supply in many manufacturing industries such as textile, steel, and more recently, mobile terminal other than telecommunications networks.

³⁸ The "Three Gaps" used to be used as general abbreviation of the gaps between the urban areas and

Before 1998, rural telephone grew rapidly, particularly for the period of 1995 through 1997, due to internal cross-subsidization of the former wireline monopolist—former China Telecom. The first round of break-up of the company and the removal of initial access charge as a direct result of government reform in 1998, however, has led to the end of the growth, as the former China Telecom slowed down investment in rural networks, claiming frustrated by tremendous business loss in providing rural services. Annual growth in terms of administrative-village-telephone-penetration plummeted from 10% before 1999 to 2% afterward³⁹.

Despite universal service obligation is instituted in the *Telecommunications Regulations*⁴⁰, it does not specify the objectives, let alone support mechanisms and regulatory governance. A “regulatory vacuum” regarding universal service—primarily rural communications, therefore emerged. As a result, no carriers care to provide rural services, some remote areas where connections were originally made even retrograded to disconnection when losses piled up.

To address the pressing issue of rural communications, MII launched the “Village Access Project” (VAP) in 2004⁴¹. In the absence of an explicit universal service regime, the VAP has been serving as a useful platform from the very beginning for implementing USOs in China. As a result, an extra of 40,000 administrative villages nationwide has been connected by the end of 2005, hoisting the per-hundred-administrative-village telephone penetration to more than 97%, from 91% before the VAP⁴².

Nevertheless, the VAP regime serves short-run goal well but with problems, particularly in terms of its inconsistent and unsustainable nature, which is embodied specifically in support mechanism and regulatory governance (Xia & Lu 2006). Carriers tend to be less responsive and cooperative to the call of the regulator in the absence of an explicit funding policy. Universal service fund has effectually become “universal excuse fund” where carriers would take refuge in fund-deficiency when being assigned with universal service tasks. The dilemma is further aggravated under ambiguous regulatory governance.

Some imputes the frustration of Chinese government in implementing USOs to the ending of cross-subsidizing era. This is probably untrue as cross-subsidizing never disappear with the structural reform, as two wireline operators still possess substantial market power in wireline local telephone market where they are de facto regional monopolists. On the other hand, deficiency in universal service funding is in stark comparison with wasteful duplicate construction.

Conclusion. After a series of structural reform in Chinese telecommunications industry, competition has been more established in mobile and long-distance market due to China Mobile and China Unicom’s aggressive pricing policies, the introduction of XLT, as well as technological development in mobile operation. By comparison, competition has been less established in wireline telephony primarily due to local loop monopoly as well as to less substitution effect from other network platforms. Rivalry within VoIP market is also substantial but has now reached a rather stable stage, and further movement in price rivalry will not come before the backbone fibre networks are actually utilized. But carriers are tacitly collusive on this type of initiatives, as it would trigger more devastating rivalry. Competition in broadband Internet access is still in the early stage due to availability of terminals, knowledge as well as to consumption pattern. In addition to price, Chinese telecom firms also compete in other arenas such as interconnection and

rural areas, industrial workers and agricultural farmers, intellectuals and physical laborers. In general, the average level of household income as well as per-hundred-inhabitant-telephone-penetration in urban areas to those in rural areas is roughly as three to one. Disparity exists not only between rural and urban, but also among different regions.

³⁹ Source: MII, “China Communications Yearbook 2004”, Beijing, 2005.

⁴⁰ See Article 44, Chapter 2 of *Telecommunications Regulation*. Chinese government are now considering upgrading it to *Telecommunications Law* and an advisory board of 26 expert members has been formed to provide advisory support to the MII that is de facto the law-writer.

⁴¹ MI, 2004. “Rural Universal Communications Service—A Guideline to the Implementation of the Rural Access Project,”. <http://www.mii.gov.cn/mii/zhuanti0516/cuntong/xgwj/xgwj4.htm>. Accessed on July 3, 2005.

⁴² Now that the CPC is mobilizing the country to launch the 11th Five-Year-Plan (FYP), part of which includes elevating the national village telephone penetration ratio to 100%⁴², which is intended to mark the beginning of transition from the concept of community access to a new level of universal service, including the promotion of household penetration in relatively developed areas and the pursuit of national informatization goal.

network deployment. Dilemmas in implementation of mandatory interconnection, wasteful duplicate construction, and unsustainable universal service regime have been among the toughest issues confronting Chinese government. Generally speaking, structural reform in Chinese telecom market has not resulted in meaningful competition as expected into the sector.

4. Interpreting Market Conducts: A System Approach

4.1. Economic liberalization with political restraining

One difference of Chinese market reform from that of other transitional economies is that it is executed without changing the fundamental political regime. The compatibility between economic liberalization and political restraining has long been a contentious issue among scholars as well as political observers, as market conducts of firms can be less predictable under this model.

Over the past decade, distortions accrued surreptitiously along with the interactions and interplays between political, economical, socio-cultural, legal, and technological forces. Problems and threats tend to be buried in a sentiment of triumph from economic growth, sometimes at the cost of environment erosion and natural resources attrition. Under this general background, market conducts of SOEs in China cannot be interpreted simply based on neo-classical theory of the firm alone, while some unique macro- and micro-forces have to be taken into account, which therefore warrants a systemic approach. As the biggest state-dominated industry in China, telecommunications can serve as a typical case where carriers' behavior as a firm is subject to various macro- and micro-forces. Figure 5 provides a basic structure of pondering for interpreting market conducts of Chinese telecom firms where the boundary of firm is ambiguous as firm is subject to material influence from various forces.

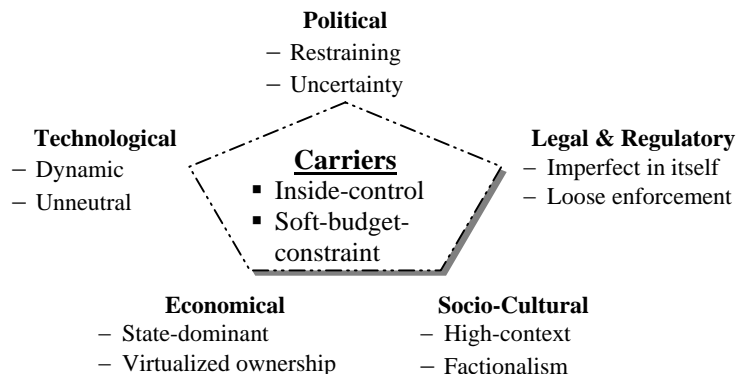


Figure 5. Market environment in Chinese telecommunications industry

4.2. Legal and Regulatory Deficiency

Telecom reform in China is executed in the absence of an explicit telecom law (or regulatory policy) and/or general competition policy. Even if MII promulgated *Telecommunications Regulation* in 2000, regulatory rules embodied in the quasi-law is still preliminary in terms of both objectives and implementing arms. Meanwhile, the *Regulations* is rather loosely enforced by the MII who not only is the drafter of it but also enjoy paramount jurisdiction in overseeing traditional telecommunications (while RFT oversees radio and cable television) before the year of 2002, since when, participation began to come from other government agencies such as SASAC and SCDR.

Current regulatory regime in telecommunications is characterized by: (a) fragmentation and insufficiency in rule itself as well as in implementation; (b) ambiguous jurisdiction arrangement between industry regulator and conventional court system; (c) emphasis on personal influence of regulatory officials rather than explicit regulatory processes; (d) lack of effective coordination between central and local agencies; (e) regulator's reputation and credibility is still to be enhanced and accountability to be rebuilt; (f) regulatory body is not independent from industry; (g) regulatory agency acts as de facto law-maker.

Under this regime, regulatory myopia happens. For example, the divestiture of former China Telecom in 2002 fails to fulfill the goal of creating reciprocal competition in wireline local market. Conversely, breakup of the former wireline monopolist merely culminates in two new regional monopolists. In addition, this breakup aggravates the status of wasteful duplicate construction, as every Chinese state-owned operator tends to build a vertically integrated independent network. This breakup appears to be even more embarrassing to the regulator when a new round of restructuring is imminent under impending deployment of 3G and with the advent of technological convergence⁴³.

Another earlier case before China Telecom's second divestiture is the former MPT's attempt in bringing China Unicom into wireline local market by awarding the later, along with its mobile license, a wireline license. The purpose of this attempt also backfired because of China Unicom's difficulty in securing interconnection with the incumbent local wireline operator, the former China Telecom.

4.3. Virtualized property ownership, agency cost and inside control

One characteristic of state-ownership is the resulting stretched principal-agent chain where government agencies and officials can be de facto residual claimer of a SOE while the general public, who are de jure primary principal or owner of SOEs, do not actually possess any say in company's operation as well as in the disposal of operational gain, which means that their ownership is virtualized one. Ineffective political governance and information asymmetry will further aggravate this situation. In extreme cases where public input as well as political influence is extremely inadequate, the stretched chain can broke at the interface between public and responsible government division as well as between government and firm.

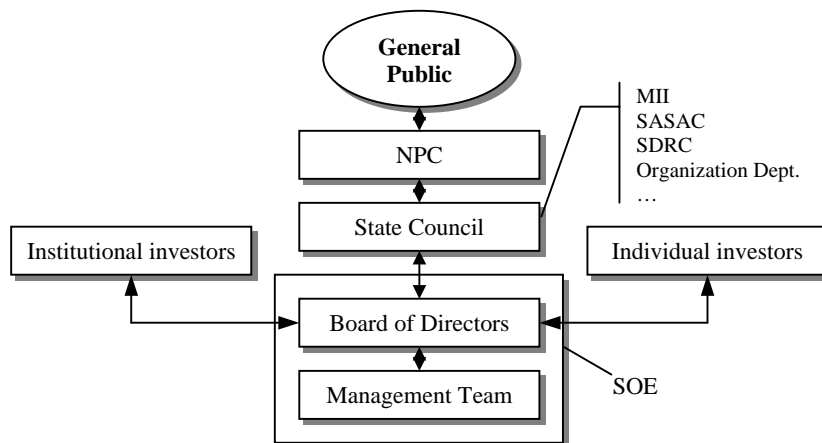


Figure 6. Principal-Agent chain of a typical Chinese telecom carrier

Figure 6 exhibits the principal-agent chain of a typical Chinese telecom SOE. At top of the P-A chain stands the *general public* who are supposed to be the de jure owners of the SOE, who delegate the NPC who in turn delegates relevant ministries of the State Council such as MII, SASAC, SDRC, and CPC Organization Department to administer or oversee the public part of the property in SOEs in the form of state-ownership. Usually a restructured Chinese SOE would have some individual shareholders as well as institutional investors (who can also be SOEs). Except for China Railcom and China Satcom, each of other dominant carriers is now offering services through a shareholding company usually listed on both Hong Kong and New York stock markets.

⁴³ In Chinese government's 11th FYP, it is explicitly written that the objectives include: "reinforcing the construction of information infrastructures such as broadband communications network, digital TV, and next generation Internet and promoting the 'convergence of three networks'".

The consequence of this stretched P-A chain can lead to insider-control problem, which is particularly the case under information asymmetry where managers and board directors can become de facto residual claimers of the firms. Under this situation, agency cost can be materially high in terms of possible opportunistic behaviors of the insiders, particularly in the absence of effective external supervision mechanisms. Some argue that the incentive of external supervision of SOEs in China decreases with the range of state-ownership as well as the scale of the SOEs, which means, a SOE of government at a lower level or with smaller scale can face higher incentive of external supervision (Zhang, 1996).

4.4. Socio-cultural and Technological Factors

Thousands years of civilization has left China with a low-context culture where people place more value on factionalism or departmentalism. The pursuit of materialism and pragmatics are also among recent cultural trends, particularly since middle 1990s. The process of market reform has resulted in varieties of interest groups or factions, whose interests may conflict. Chinese people now enjoy more freedom than before in deciding what they think about themselves as well as the universe. This freedom, together with low-context cultural tradition and a relatively one-sided market reform, has been leading to more cultural dynamics in terms of the way people judges and behaves.

As one of the most dynamic industry in terms of technological development, telecommunications has been witnessing fastest technological changes over the past decades. The life-cycles are much shortened now as compared with the turn of 20th century when telephone was first invented. Migration toward 3G or next generation has been a recent worldwide trend.

4.5. Corporate Governance of the Firm

As mentioned above, inside-control is a salient issue identified with state-owned (or more precisely, state-controlled) telecom operators in China. To streamline supervision of telecom carriers as SOEs, job-approval rating is now the responsibility of SASAC, transferred in recent year from MII who used to have decades long interweaved personal and administrative relations with the industry. As state-asset watchdog, SASAC takes in charge of nominating company directors and top executives who would then be confirmed and officially appointed by the party's organization department. Apart from the industry regulator (MII), state-asset overseer (SASAC), the nominal residual-claimer (general public) and other relevant government agencies (such as SDRC), other stakeholders in a state-owned telecom company may include:

- *Investors (individuals or institutions),*
- *Creditors,*
- *Manufacturers,*
- *Consumers,*
- *Other interested outsiders (external individuals and parties),*
- *Corporate insiders (Directors and managers)*

Except for consumers and interested individuals, agency problems can also be identified with organizational stakeholders such as institutional investors, state-owned banks and telecom manufacturers, which will further complicate the process of decision-making and daily operation of telecom carriers. Carrier's presence in capital markets, particularly being listed on overseas stock markets can empirically reduce the likelihood of corporate insiders' opportunistic behaviors and the informal influence of interested outsiders. Nevertheless, the effect of either individual or institutional investors on corporate governance of telecom firms can be minimal at this stage due to limited scale of their shareholding, information asymmetry, as well as spatial distance. Unlike other stakeholders, SASAC's influence on operators can be more straightforward, one example of which witnessed in recent years has been the mandatory switch of top executives among carriers who all report to SASAC as SOEs.

5. Forces of Resource Allocation and the Nature of Competition

Based on system approach, it is easier to identify the forces of resource allocation and the nature of competition, if any, in Chinese telecom industry, which would in turn, help interpret market

conducts. Under current macro- and micro-environment, resource allocation is subject not only to market force but also to some other political, personal, socio-cultural factors, while at the same time, the nature of competition is deviation from profit maximization.

5.1. Forces of Resource Allocation in Chinese Telecom Sector

Three forces have developed over the past decades in resource allocation in Chinese telecom industry:

- *Market force*. Marketization has been primary purpose of telecom structural reform, which has resulted in the divestiture or separation of telecom industry from the government, at least in accounting terms. Meanwhile, the stocks of four out of six carriers have been listed on overseas markets, which account for major part of telecom asset in the country. Accounting separation and presence in foreign capital market, among other things should be contributory to market-oriented business conducts.
- *Administrative (or regulatory) force*. The fact that general market system is not established and majority state-ownership would inevitably lead to substantial government presence in business decisions, either through industrial regulatory arms (e.g., MII), state-asset watchdog (SASAC), or other administrative measures, as agencies such as MII, SASAC, or SDRC are just different branches of central government. Government potentially possesses paramount power in intervening carriers' daily operations as well as strategic investment.
- *Individual (or group of individuals)*. The virtualization of ownership and inside-control in state telecom operator can translate into substantial power of personal influence in disposing business resources or decision-makings. The option for cooperation or rivalry with other carriers is more or less reliant on interpersonal interactions among business executives and government officials.

All of the three forces are playing crucial roles in the direction of where this industry is going, in terms of future market structure as well as deployment of new technology. Although Chinese government has been trying to streamline the government-business relations, it could be less risky to predict that these three forces will continue to exert substantial influence on the industry in the foreseeable future before any major initiatives are taken in ownership arrangement, market development as well as political regime.

5.2. Incentive Hierarchy of Competition

The three forces of resource allocation are more general in terms of their impact on market conducts. For a typical telecom firm (and sometimes regulatory agencies), these forces would translate into a vector of specific motives or incentives toward competition. Juxtaposing the three forces in resource allocation at economy and industry level, a hierarchical source of incentives toward competition at corporate level can also be identified which would directly manipulate firms' competitive behavior.

- *Business*. The pursuit of ROI is the basic rule of capitalism and should be the primary reason for competition and the basic condition for the sustenance of a business organization in a market economy.
- *Individual*. As a rational consumer, individual's problem is the maximization of personal net surplus (welfare) by choosing from all possible alternatives of private actions. This individual rationality itself is independent of whether the individual in question is in a market economy or otherwise.
- *Factional/departmental*. Factionalism/departmentalism can be regarded as collusion (tacit or explicit) among individuals who pursue respective private goals. This incentive is assembled based on either formally organized entity or loosely correlated interest group. It can also be treated as extension of the second incentive (individual).

These sources of incentives toward competition are hierarchical because for a representative individual his interest may be embodied in all incentive levels. Figure 7 provides a simple model illustrating the relationship among the three levels of incentives. From the figure it can be seen that desirable competition may only take place when all incentives are compatible with each other. Without separation of ownership and control, the objectives of business and individual are

naturally compatible. Under separation of ownership and control, however, agency problems may arise under imperfect information.

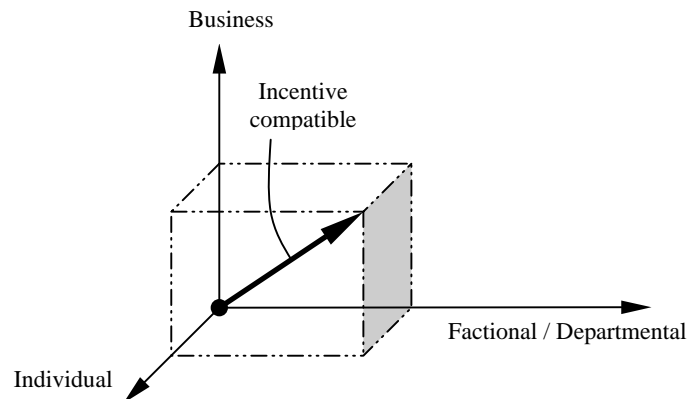


Figure 7. Incentive hierarchy of competition

5.3. Roles, Relations and Conducts: the Nature of Competition

Based on previous discussion, it can be known that Chinese telecom operators have been assuming multiple roles and relations since telecom structural reform:

- *Rivals* as market participants,
- *Siblings* as SOEs,
- *Partners* (e.g., in interconnection, collocation, etc.) as network operators.

This has led to paradoxical situation where carriers are expected to execute a head-to-head competition while they are by nature hand-in-hand in terms of ownership arrangement. The confused roles and relations can led to confused market conducts or distortions in deciding whether or how to compete or collaborate in such arenas as pricing, interconnection, collocation, network deployment, and etc.

While response to this question might be a complicated empirical inquiry, from experience some preliminary findings can still be reached as to the causality between the roles, forces, and behaviors. Price rivalry in mobile sector, for example, can be interpreted as a result of certain level of incentive compatibility among *individuals*, *departments* and *business* where market force prevails. In the case of interconnection, although it is not that black and white at this stage when it comes to which incentive or force is dominating, however, one intuition is that *individual* or *departmental* incentives may still outplay other ones.

The provision of universal service is an example where the implementation is supposedly subject to *administrative* (or regulatory) forces. Nevertheless, these forces were not that functional in the early stage of the VAP when *individual* and *departmental* forces prevailed, while in late stage of the first phase of VAP, administrative forces began to play, which is exercised, however, also through individual influence of certain regulatory officials. It can be predictable that, being a longtime legacy of Chinese economy, administrative force is by no means to abdicate in the course of market reform. As a matter of fact, administrative force can actually serve as failsafe mechanism when market force does not play.

Another case is duplicate construction where by experience *individual* and/or *departmental* incentive /force has been dominating even though *administrative* (or *regulatory*) force is supposed to play some role herein. The absence of regulatory force when it is meant to present can be attributed to secondary agency problems where regulatory officials or agencies are captured by interest groups as well as to insider-controlling problems in telecom firms where individual and/or departmental interests can prevail. Due to the more hidden nature of the consequence of wasteful

duplicate construction as compared against universal service, regulatory force is usually weak in this area, which is probably due to low *individual* and/or *departmental* incentive in this direction⁴⁴.

Conclusion. Before trying to understand the market conducts of Chinese telecom firms, there is a need to take a look at the underlying macro-context in terms of general political, legal, regulatory, socio-cultural, economical, and technological environment, as well as micro-context in terms of ownership arrangement and corporate governance of the firms. Economical liberalization under political restraining, low-context culture characterized by factionalism or departmentalism, virtualized ownership arrangement without effective supervision and regulation, and, as a result, soft-budget-constraint in investment—these have collectively hatched a technologically dynamic regulated industry like telecommunications in China that is supposedly deviating from maximizing social welfare. This ambiguity has led to various sources of resource-allocation forces in Chinese telecom industry, i.e., market, administrative, and individual and/group of individuals forces, which has been directing and framing the current telecom sector. Desirable competition cannot happen in the absence of compatibility among business, factional and/or departmental, and individual incentives, which is even more doubtful when Chinese telcoms have been assuming confused roles as rivals, siblings, as well as partners. Distortions therefore arise herein when the boundary of telecom companies is not clear and regulators hold interests in the industry, which partly explains the confused market conducts. Under this institutional arrangement, certain level of competition does take place in various segments as well as the industry in general. Nevertheless, this competition might not be meaningful enough or sustainable it is between firms with single state-ownership, the organization of which reminds one of multiple accounting-separated subsidiaries within one single conglomerate, which is particularly true when the state-asset watchdog (SASAC) still appears to be unready to embrace the “public interest” idea but instead emphasizes the “state interest” (or “government interest”).

6. Looking into the Future

The objective of Chinese telecom reform is incentive incompatible as well as lacks of participation constraints among various stakeholders, participants, interest groups, etc. From institutional point of view, it appears that the Chinese paradigm of reform has been following a path that focuses more on formal institutions and organizations but pay less emphasis on informal institutions and organizations while the influence of the later could be material given Chinese circumstances. Even if within the frame of formal institution and organization, it is more often ceased at formalism rather than pragmatism, and more often, it also lacks of serious implementation.

Given current circumstances in China, effective regulatory reform is subject to a number of restraining forces, which again makes it problematic that (Xia & Lu 2005):

- Whether competition can really develop alone in an industry without the establishment of general market system?
- Whether the enforcement of a telecom law (given there is one in the future) without a general competition policy in place can really lead to effective regulation?
- Whether genuine regulatory independence can possibly surface under current interweaved and complex political and interpersonal configuration?
- Whether genuine and effective competition among operators will eventually develop before any major changes made to corporate governance of the firms and political governance of the state?

Legislation in telecommunications in China has been a decade long journey. Several updates have been made to the new telecom law since it was first drafted. It appears that current regulators, carriers, as well as general public in China have raised irrationally high expectations towards the imminent effect of the law on the industry. Nevertheless, as an old Chinese idiom goes that “the burden is heavy and the road is long”—competition reform in telecommunications as well as in

⁴⁴ As a matter of fact, network expansion, whether efficient or not, is probably in favor of individual or departmental interests of regulatory officials. Meanwhile, personal relations between regulatory officials and corporate executives can be complicated where they share some interest in common and tacit collusion can therefore take place in the enforcement of laws or rules that is detrimental to the goals of individuals involved.

the economy in general in China still has a long way to go, which is by no means a once-for-all battle.

The ultimate objective of the telecom reform is to promote efficiency by bringing competition into the industry. To this end, changes are therefore needed to the current status of telecom firms as market participants. The most fundamental changes probably include transition of individual operators from inside-controlled government subsidiaries to independent business-firms who are responsible primarily for shareholders (investors), and transition of what between firms from confused relations and roles to shoulder-to-shoulder competition in market where they do not collude but cooperate in areas (interconnection, collocation, number portability, etc.) where market fails.

To make these changes to market conducts happen, some changes have to first happen at corporate, industry, as well as regulatory levels. First and foremost, current impediments, embedded in either formal or informal institutional arrangements, have to be tackled before any meaningful competition can actually come. To this end, at least following arenas are on the list of immediate attention:

- Perfecting the current regulatory rules,
- Expediting regulatory convergence and reinforcing the rule of law,
- Creating more regulatory independence, transparency, and consistency,
- Supervising the supervisors,
- Timely restructuring the industry, and
- Streamlining corporate governance of the telecom firms.

If take a long-run perspective, the sustainable foundation for bringing effective and genuine competition into the industry relies ultimately on the establishment of a well-balanced political regime, explicit and transparent property system, and ultimately, the general market system. Anyway, you should not make a right with left turn signal on.

7. Concluding Remarks

Economic liberalization with political restraining can lead to distortion in firms conducts as well as in industry performance. This paper takes a look at the effect of structural reform on market competition in Chinese telecommunications industry where product market competition is supposed to be among firms who share a single parent of government agency as dominant shareholder. Based on an investigation on the general status of competition at industry level, it is found that the development of competition varies across service segments with more establishments in relatively new service modes such as mobile and VoIP but less rivalry in traditional service segments, particularly wireline local loops where China Telecom and China Netcom are still monopolists in their respective regions. As a result, cross-subsidizations can occur as strategic actions of incumbent local exchange carriers who may foreclose competition in traditional PSTN long distance segment. Inefficient market conducts are also embodied in interconnection arrangement, wasteful duplicate construction, as well as universal service provisioning.

The interpretation of market conducts of Chinese telecom firms relies not only on conventional theory of firms but rather on a systematic approach based on consideration of a series of macro- and micro-factors. Under Chinese unique political, socio-cultural, legal and regulatory, and economic circumstances, three forces (market, administrative, and individual) of resource allocation at industry level as well as three sources of incentives (business, individual, and factional) toward competition at corporate level, which has been determining the direction of the industry, are therefore identified. Distortions are characterized generally by deviations of firms from profit maximization as well as of regulator from public interest, which is particularly the case when Chinese telecom firms are now assuming confused multiple roles as rivals, siblings, and partners and in the absence of a functional competition policy and an independent, transparent, and accountable regulatory arrangement.

While interim solution to bringing meaningful competition into Chinese telecommunications industry lies in further perfecting regulatory reform as well as in streamlining corporate

governance of the telcoms, a more sustainable solution depends on the establishment of a well-balanced political regime, explicit and transparent property system, and ultimately, the general market system.

Limitations of this study may include that it only provides an overall assessment of competition development based on blended analysis at industry or firm level whereas it would be more insightful if based on more service-specificity and granularity. Meanwhile, findings related to the status of the industry as well as its underlying factors in this paper are still preliminary in nature that are subject to further empirical work based on detailed time series analysis and better structured survey research. They are left to future enquiry, though.

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