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Anti-Competitive Behaviors in Managed Competition: The Case of China's Telecommunications Industry

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Abstract:

The Chinese telecommunications industry has attracted considerable interest in recent years. Much of this interest has, however, focused on issues such as the growth of the industry, its structure or how it is regulated. The anti-competitive behavior of incumbents, however, has largely been overlooked. This article addresses this oversight by focusing on the incumbents' suspected anti-competitive behaviors within the Chinese broadband telecommunications market. In doing so, the key role of the June 2001 Circular in shaping operator behaviors within the broadband telecommunications market is highlighted. From the analysis it is clear that the incentive of anti-competitive behaviors exists in the Chinese broadband market structure that was created through restructuring and June 2001 Circular, and that anti-competitive strategic behaviors of the incumbents are suspected to have occurred. The Chinese government does not have at its disposal, or has not implemented, measures to counter or deter this type of behavior.

Keywords: China, telecommunications, broadband, anti-competitive behavior

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I. INTRODUCTION

The importance of broadband, with its wide-ranging socio-economic benefits has been widely acknowledged [Benkler, 2010; ITU, 2003 and 2007; OECD, 2009]. So that these benefits can be maximized, governments have sought to promote the diffusion and adoption of broadband through encouraging the development of competition, supporting infrastructure investment, and educating would-be users [Benkler, 2010; Howick and Whalley, 2007; ITU, 2003]. Since the early 1990s China has been introducing competition into its telecommunications industry, with enhancing competition being a long standing policy objective [Tan, Foster, and Goodman, 1999; Xu and Pitt, 2002]. Central to this policy has been a series of industry-wide restructurings that have culminated in the Chinese telecommunications industry being centered around three large operators. These have been complemented by regulatory interventions, often in the form of Circulars, which provide rules, guidelines, or characteristics for activities or their results as normative documents issued by a ministry or jointly by ministries. While these changes have collectively contributed to the rapid growth of the telecommunications industry at large, this study finds that the policies implemented subsequent to the June 2001 Circular have nonetheless failed to promote competition in the *broadband sector*. As a result, a gap exists between official pronouncements and the reality that occurs on the ground. The key issue here is that the market structure that has emerged after the industry-wide restructuring has created two vertically integrated, regionally dominant incumbent operators that are able to act anti-competitively against new entrants, while the Chinese government does not have at its disposal, or has not implemented, complementary measures to counteract or deter this type of behavior.

Although this type of anti-competitive behavior of incumbents may take many forms, it is derived from their structural position in the marketplace. The fixed incumbents are monopolists in the north and south of China; they control the international gateways as well. This means that new entrants are required, to a lesser or greater extent, to use the assets of the incumbents to deliver their own services. Control of these assets provides the incumbent operators with the means of forestalling the development of competition through, for instance, refusing to trade, charging higher prices, or degrading the quality of necessary inputs required by new entrants. It is this relationship, overlooked by previous academic research, between the incumbent and new entrant, that has important implications on broadband development, not least on convergence between the telecommunications and broadcasting industries that the Chinese government has sought to encourage by organizing a series of trials since January 2010. In order to explore this relationship, the remainder of the article is divided into four sections. Section 2 provides an overview of the Chinese telecommunications industry, drawing attention to the successive rounds of restructuring and the notion of "managed competition" within the industry. This literature review highlights that the alleged anti-competitive behavior of the incumbents under the managed competition that emerged after the separation of regulation from operation has been overlooked in the analyses that have been undertaken. The focus then shifts to broadband in China in Section 3, as the circumstances leading up to issue of the June 2001 Circular are recounted. Section 4 investigates the implications of the resulting market structure, while Section 5 looks at its impact on the broadcasting industry. Conclusions are drawn in Section 6.

II. MANAGED COMPETITION

Until 1993 telecommunication services in China were the preserve of the Ministry of Posts and Telecommunications (MPT). Within the Ministry, telecommunications services were delivered by the then Directorate General of Telecommunications and its Provincial Telecommunications Administrations. As a consequence, the Ministry was simultaneously both regulator and service provider. In 1993 companies not affiliated with MPT were permitted to enter the value-added services market, with one of the most prominent providers, Ji Tong Communications, making its market debut in January 1994. Shortly afterward, in July 1994, China United Telecommunications Corporation was founded with a full service license [Xu and Pitt, 2002; Fan, 2005]. These changes represent the introduction of competition into the Chinese telecommunications industry.

Starting in 1998, a series of changes were made to separate regulation and service provision from one another. In 1998 the Ministry of Information Industry (MII) assumed the regulatory role of MPT, with service provision being transferred to four state-controlled operators in May 2000. China Telecom received the fixed assets, and China Mobile the mobile operations, whilst satellite became a separate business under the name China Satellite. Paging was transferred to China Unicom, which focused on the mobile industry after being incorporated in 1994. This was an effort to create, through managerial focused actions, a more level-playing field for China Unicom to compete against China Mobile [Xu and Pitt, 2002].

However, as can be seen from Table 1 (below), another round of restructuring was implemented just a few years later in 2002. In this restructuring, the fixed assets of China Telecom were geographically separated. China Telecom retained the assets of the southern provinces as well as 70 percent of the national and international trunk operations, with the rest of the company being transferred to China Netcom [Fan, 2005]. After this restructuring, there were six operators: China Telecom, China Unicom, China Railcom, China Satellite, China Mobile, and China Netcom. Interestingly, not all of these were present in all possible lines of business, with the consequence that markets were regional near-monopolies in the fixed line market and nationwide duopolies in the mobile sector, a managed attempt to mix homogenous and heterogeneous competition [Fan, 2005]. The significant exceptions were Internet backbone services with five operators present, and Internet access services with a typical oligopoly consisting of the above uneven nationwide operators and a fringe of many small dial-up or broadband non-nationwide providers. What has happened in the market for Internet broadband access is the focus of this article.

Table 1: Major Developments in the Restructuring of the Chinese Telecommunications Industry

Year	Development
1993	<ul style="list-style-type: none"> China Ji Tong initiated
1994	<ul style="list-style-type: none"> China Unicom established
1998	<ul style="list-style-type: none"> MPT replaced by Ministry of Information Industry (MII) China Telecom restructured
2000	<ul style="list-style-type: none"> China Telecom, China Mobile and China Satcom established
2002	<ul style="list-style-type: none"> China Telecom restructured geographically. Since it remains dominant in the fixed network in the southern provinces; and China Netcom in the northern provinces
2008	<ul style="list-style-type: none"> Industry-wide restructuring leading to the consolidation of the industry around three companies announced and started: China Mobile, China Unicom and China Telecom MII became part of Ministry of Industry & Information Technology
2009	<ul style="list-style-type: none"> 2008 restructuring aforementioned completed 3G licences awarded to China Unicom, China Telecom and China Mobile

Source: compiled by the authors

The third and most recent restructuring of the Chinese telecommunications industry occurred in late 2008 and early 2009. China Netcom was dissolved and its assets transferred to China Unicom, which in turn retained its GSM business but sold its CDMA operations to China Telecom. China Mobile acquired China Railcom, and China Satellite became part of China Telecom [MIIT et al., 2008]. As a result of this third round of restructuring, the Chinese basic telecommunications service industry is centered around three large operators—China Unicom, China Mobile and China Telecom—that were all granted a third-generation mobile license in January 2009. Just prior to this round of restructuring, the newly established Ministry of Industry and Information Technology (MIIT) absorbed the regulatory functions of MII in June 2008.

It is perhaps unsurprising that the successive rounds of restructuring outlined above, as well as the growth of the Chinese market more generally, has attracted the attention of researchers. Reflecting the scope of the telecommunications on the one hand and its pivotal socio-economic role on the other, the research is wide-ranging in character. It ranges from an exploration of the relationship between foreign direct investment (FDI) and equipment manufacturing within China [Tan, 2002] to an empirical investigation into the productivity of operators within China [Lam and Shiu, 2008], and how the digital divide that has emerged within China is being tackled [Xia and Lu, 2008].

Other research has explored the interplay between regulation and market structure, and as such is of greater relevance here. Gao and Lyytinen [2000], for instance, adopt a “macro perspective” to investigate the reform process within China. After arguing that telecommunications reform needs to be placed within the broader context of economic and political change, they show how changes to both the regulatory regime and market structure have been enacted over a number of years, through the use of administrative methods on the one hand and the adoption of a “act after trials” approach on the other hand. In this approach, changes are trialed before more far-reaching changes to regulation and market structure are made. Zhang [2002] identifies both formal and informal institutions within China’s telecommunications industry. The mixture of formal and informal institutions complicates the already complex policymaking environment that exists within the Chinese telecommunications industry.

A broad perspective is evident in Loo [2004], who proposes a three-fold analytical framework in order to understand telecommunications reform. The framework contains the concerns of the government, pressure from foreigners and market forces. The application of this framework enables Loo [2004] to illustrate how the drivers of telecommunications reform have changed over time. Prior to the start of telecommunications liberalization in 1994, state concerns dominated though market forces were becoming stronger. Between 1994 and 1997,

telecommunications reforms were driven less by state concerns and more by foreign pressure and market forces. The balance between the three factors also shifts in the next period identified, which runs from 1998 to 1999. Foreign pressure was probably the dominant factor over these two years, though market forces were also influential. Less noticeable was the continued presence of state concerns, as evident in the continued state control of the largest operators. In the final period identified, 2000 to 2004, the influence of foreign pressure declined while state concerns reasserted themselves, along with market forces, to shape the development of the industry. If we were to update the analysis to cover the period since 2004, it is arguably the case that reforms in China have been driven by market forces and state concerns.

The heightened influence of foreign pressure in 1998 and 1999 corresponds to the period just before China's accession to the World Trade Organization (WTO) in 2001. Zhang [2001] links the restructuring initiated by MII shortly after it was created with the need to enhance the competitiveness of Chinese companies prior to the full liberalization of the market that was promised as part of the WTO accession negotiations. In addition, China's entry into the WTO also contributed to the swiftness with which the changes were enacted. It is worth noting, however, that Zhang [2001, p. 473] states that the restructuring of China Telecom has had only a limited impact on promoting competition, and it is questionable whether the competitiveness of China Telecom and China Unicom have been enhanced as a consequence of the government's "managed competition" policy.

Managed competition is one of the issues raised by Owen et al. [2008] in their wide-ranging discussion of the Anti-Monopoly Law in China. They argue that the key competition policy issues faced in China are linked to the country's transformation from a centrally-planned to a market economy. Some people in China argue that limiting excessive competition rather than enacting and enforcing the Anti-Monopoly Law should be prioritized in China. Owen et al. [2008] counter this argument, noting that the examples raised are not ones of there being too much competition but rather examples of competition gone awry. Two additional issues identified by Owen et al. [2008] are the role of state-owned enterprises and administrative monopoly. They use the restructuring of the telecommunications industry, which saw the break-up of a single state-owned entity into several that competed against one another, to illustrate how the government has sought to introduce competition into a variety of markets. Having said this, Owen et al. [2008] then go on to assert that although this restructuring successfully broke-up the monopoly provider the amount of competition that resulted was often very limited.

Li [2009] also considers competition within the Chinese telecommunications industry, though from a different perspective than Zhang [2001]. Li explores whether the restructuring of telecommunications industry within China contravenes the country's Anti-Monopoly Law that took effect in August 2008. As chapter five of the law addresses the use of administrative power to eliminate or restrict competition, Li argues that, as the most recent restructuring of the industry was made through administrative power, it is anti-competitive in nature. She does not discuss the anti-competitive behaviors of incumbents. Interestingly Li [2009, pp. 368f] suggests that for a variety of reasons the Anti-Monopoly Law will not have an impact on the telecommunications industry, and, as a consequence, its role needs to be revisited in the future. Like Owen et al. [2008], Zhang and Zhang [2007] contend that the enactment of the Anti-Monopoly Law is a significant step forward. However, they cast doubts on its overall effectiveness since two issues remain unresolved. One of these issues is the enforcement structure, while the other is the nature of administrative monopoly. Taken together, it is questionable whether the enforcement agencies of the Anti-Monopoly Law will have either the power or capacity to apply the law to the administrative monopoly created by the government that protects several sectors, telecommunications included.

This literature on China's restructuring of its telecommunications industry focuses on the restructurings, the structure of the market both before and after the restructurings, and nationwide operators. But little of the literature touches on the suspected anti-competitive strategic behaviors within the market structure created by the restructurings. Only materials directly related to the incumbent's anti-competitive behaviors were originally reviewed by Xu, Pitt, and Levine [1998]. It was later elaborated in Xu and Pitt [2002]. In the sole chapter on the entry of China Unicom, Xu and Pitt [2002] discuss the barriers raised by the incumbent and regulator alike in the 1990s with regard to interconnection between China Unicom and China Telecom's fixed and mobile arms. Significantly, Xu and Pitt [2002] only identified issues among national operators. These issues were addressed through the separation of regulation from operation in 1998 and the separation of China Mobile from China Telecom in 2000. Though Yu et al. [2004] identified some instances of unfair competition after the 1998 reform, they touched on only those among national operators in terms of interconnection between operators and cross-subsidy between services of the same operator.

In this article, we identify and then critically evaluate the suspected anti-competitive strategic behaviors of the incumbents in the broadband access market within the context created by the restructuring of the industry and its regulation. The dominant and vertically-integrated nationwide operators are suspected of, in standard industrial organization theory terminology, foreclosing, that is, excluding, those non-dominant and non-national operators who rely on purchasing inputs from them. Through examining these behaviors, which involve non-dominant and non-

national operators, this article sets itself apart from previous research and thus contributes to the ongoing debate regarding the structure and regulation of the Chinese telecommunications industry.

III. JUNE 2001 CIRCULAR

Competition within the telecommunications industry is identified by Fan [2005] as being one of the key determinants of Internet affordability and availability within China. It is argued that through restricting the Internet services that operators can provide, backbone competition was limited. As a consequence, it was expensive for Chinese Internet Service Providers (ISP) to access the Internet internationally. For instance, China Telecom charged \$73,000 per month for 2Mbps in 1998 compared to \$50,000 in Australia and \$22,000 in the United States [Fan, 2005, pp. 199f]. The high cost of Internet access as well as poor service quality caused users to complain [Harwit, 2008; Zhao, 2000].

Although the issue of high costs began to be discussed in early-1999, it was not until 2000 that a Circular was issued that substantially reduced the cost of a series of Internet products [MII et al., 2000]. This Circular reduces the prices of dedicated lines. The dedicated lines could be used in the feeder and distribution sector, which connects an exchange to a converging point where the lines of all subscribers in a (or couple of) real estate property management area (REPMA) converge. This price decline encouraged ISPs to provide broadband access services [Harwit, 2008].

Since Internet service had been classified as a *value added service* with lower policy barriers, the period from late 2000 until mid-2001 saw the establishment of competing ISPs, resulting in such strategic behaviors: Incumbent and non-incumbent commercial Internet interconnection operators (which are called Category A operators in this article), as well as new entrants not licensed to operate commercial Internet interconnection services (Category B operators), sought to monopolize the provision of broadband on a REPMA by REPMA basis. Although the 2000 Circular reduced prices, the strategic behaviors of both types of operators “resulted in the duplication of telecommunications networks, left a lot of resources unused, wasted a lot of funds, and even impeded telecommunications security” [MII, 2002].

The primary policy response to the aforementioned duplication that was subsequently described by the MII was the June 2001 Circular. Neither Yu et al. [2004], Fan [2005] nor Harwit [2008], or any one else for that matter, refer to this Circular, which is surprising given the structure that it has imposed on the Internet in China. The June 2001 Circular—*The Circular of Undertaking Trials of Opening Markets of Network of Residence*—sought to clarify the regulation of broadband telecommunication services, determining that it was a form of *basic* telecommunication service and limiting Category B entrants to the drop sector in thirteen cities. Of these thirteen cities, three—Beijing, Jinan and Qingdao—are in the north where China Netcom (now China Unicom) was dominant after geographical restructuring in 2002 while ten—Shanghai, Shenzhen, Guangzhou, Wuhan, Nanjing, Hangzhou, Ningbo, Xiamen, Chongqing, and Chengdu—are in the south where China Telecom is the incumbent operator. Category B entrants are not allowed to build any new drop sectors *outside* these thirteen cities, nor are they allowed to build any new feeder and distribution sector networks *anywhere* in China (including in trial cities) [MII, 2001]. Due to this restriction, Category B entrants are required to rely on the incumbents and other Category A entrants for their interconnection, even with the domestic Internet backbone. The nature of such trial activity relating to this Circular makes our discussion and its possible consequences all the more important, given that policymakers in China broadly followed what Gao and Lyytinen [2000] described as “act after trials” approach.

The market structure that emerged after the June 2001 Circular is shown in Figure 1. This figure highlights the limited scope of Category B operators: they are limited geographically to just thirteen cities as well as operationally to the drop sector and thus have to seek interconnection with, or purchase inputs from, Category A operators in the feeder and distribution sector in order to connect with the domestic Internet backbone. In contrast, all Category A operators are legally allowed in both the feeder and distribution and drop sectors, though two of them—regional incumbents in Category A, that is, China Telecom in south and China Netcom (now China Unicom) nearly monopolize the drop sector, and are the largest provider in distribution and drop sector in either of regions. Category A operators could be divided into *Category A entrants* and *incumbent*. China Telecom is the Category A incumbent in south of the country, but a Category A entrant in the north. In contrast, China Netcom (now China Unicom) is the Category A incumbent in the north but a Category A entrant in the south of China. In addition, Category B operators must also rely on the two incumbents—initially China Telecom, and then China Telecom and China Netcom (now China Unicom)—for their connection to the Internet outsider China as only they are allowed to construct and operate international gateways [Tan et al., 1999].



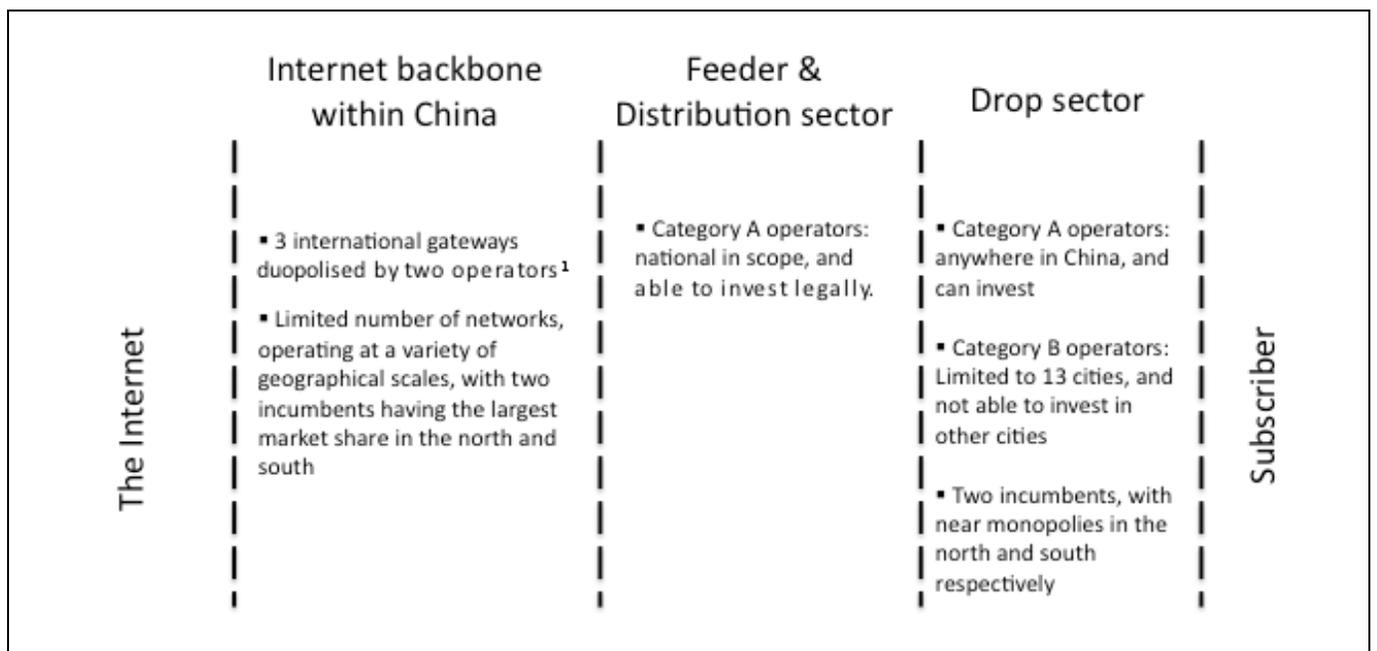


Figure 1. The Structure of the Internet in China, Post-June 2001 Circular

The motivations for the June 2001 Circular, as stated in its first appendix, are fourfold: firstly, to normalise the operation of the broadband Network of Residence market; secondly, to encourage fair competition; thirdly, to ensure the rights and interests of most telecommunications customers; and fourthly, to facilitate the development of the Internet and broadband services [MII, 2001]. To normalise the operation of the market is interpreted as addressing the duplication issue. By simply limiting the Category B entrants, the June 2001 Circular tries to control the duplication of infrastructure by the Category B entrants, but leaves the duplication by the Category A entrants and incumbents unaddressed. In 2008, seven years after the issuing of the June 2001 Circular, Mr. Jiayi Liu, China's Auditor-General, reported to the People's Congress Standing Committee that there was a large duplication of investment by the Category A entrants and incumbents [Liu, 2008]. Whether the June 2001 Circular achieves one of its other aims—to encourage fair competition—is the focus of this article. With this in mind, we will consider operator strategy in the market structure emerging subsequent to the June 2001 Circular.

IV. MARKET STRUCTURE AND OPERATOR STRATEGY

It is clear from Section 2 (above) that considerable effort has been made to manage the development of competition in the Chinese telecommunications market. The market has been restructured, albeit several times in an attempt to find the most appropriate structure, and China has joined the WTO with all that this entails. However, competition in the broadband market has not developed as anticipated. The restructuring of the telecommunications industry has created two incumbent operators that remain entrenched within their respective home regions: China Telecom in the south and China Netcom (now China Unicom) in the north. Significantly, these two companies were also granted an international gateway duopoly by the government.

The presence of the incumbent operators throughout the network places them in a structurally powerful position (vertical integration), enabling them to influence how the market develops. To “unfairly” gain market share vertically integrated incumbents could employ various anti-competitive strategies, the incentives and the theories of which are discussed in a long strand of industrial organization literatures and have been referred in many antitrust (anti-competition) and regulatory cases [see, for example, Armstrong, Cowan, and Vickers, 1994; Laffont and Tirole, 2000; Rey and Tirole, 2007]. One of the most well-known examples of anti-competitive behaviors is that which took place in the U.S. where a vertically integrated AT&T abused its significant position in the local market to foreclose its competitors in long-haul service market. Such behaviors ultimately resulted in the Modified Final Judgment that broke AT&T into eight different companies [Laffont and Tirole, 2000]. A more recent example can be found in the UK, where the Office of Communications (Ofcom), the telecommunications regulator, wrote that:

... in parts of the network where it is uneconomic for new entrants to build their own infrastructure, competitors are reliant on BT [British Telecom] to provide wholesale access to its network. Yet those who have relied on BT to provide such access have to date experienced slow product development, inferior quality wholesale products, poor transactional processes, and a general lack of transparency [Ofcom, 2005, pp. 19].

These concerns ultimately led to Ofcom imposing a range of remedies on BT (the vertically integrated incumbent), including functional separation and equality of access to ensure that other operators who rely on inputs from BT to deliver their own products are not disadvantaged in any way by BT.

These theoretical, legal, and regulatory debates suggest that the incumbents in China may also be able to act anti-competitively and foreclose their competitors by abusing their powerful vertically integrated structure if unchecked, since vertically integrated incumbents nearly monopolize the drop sector and are dominant providers in feeder and distribution sectors, while being the largest domestic Internet backbone providers and being the only two international gateway providers.

According to Article 18 of the Anti-Monopoly Law of China a business operator may be assumed to have a dominant market position if one of the following two conditions (among others) are satisfied, namely, that the relevant market share of a business accounts for more than half of the market, or if the joint relevant market share of two businesses accounts is two-thirds or more. Thus, if the Anti-Monopoly Law had existed before its enactment in 2008, or applied to the telecommunications industry since it became effective, the two incumbents would be designated as operators with dominant market positions in retail broadband, feeder, and distribution sectors, backbone, and international gateways. According to Article 17, they would be prohibited from engaging in a wide range of anti-competitive actions by abusing their dominant market position. They would not be able to sell commodities at unfairly high prices, sell products below cost without a justifiable cause, or refuse to trade with others unless they have a justifiable cause [NPC, 2007]. Nor would the two incumbents be able to apply differentiated pricing or other transactional terms on counterparties with equal standing. Figure 2 presents three different situations in which anti-competitive strategies are suspected to occur.

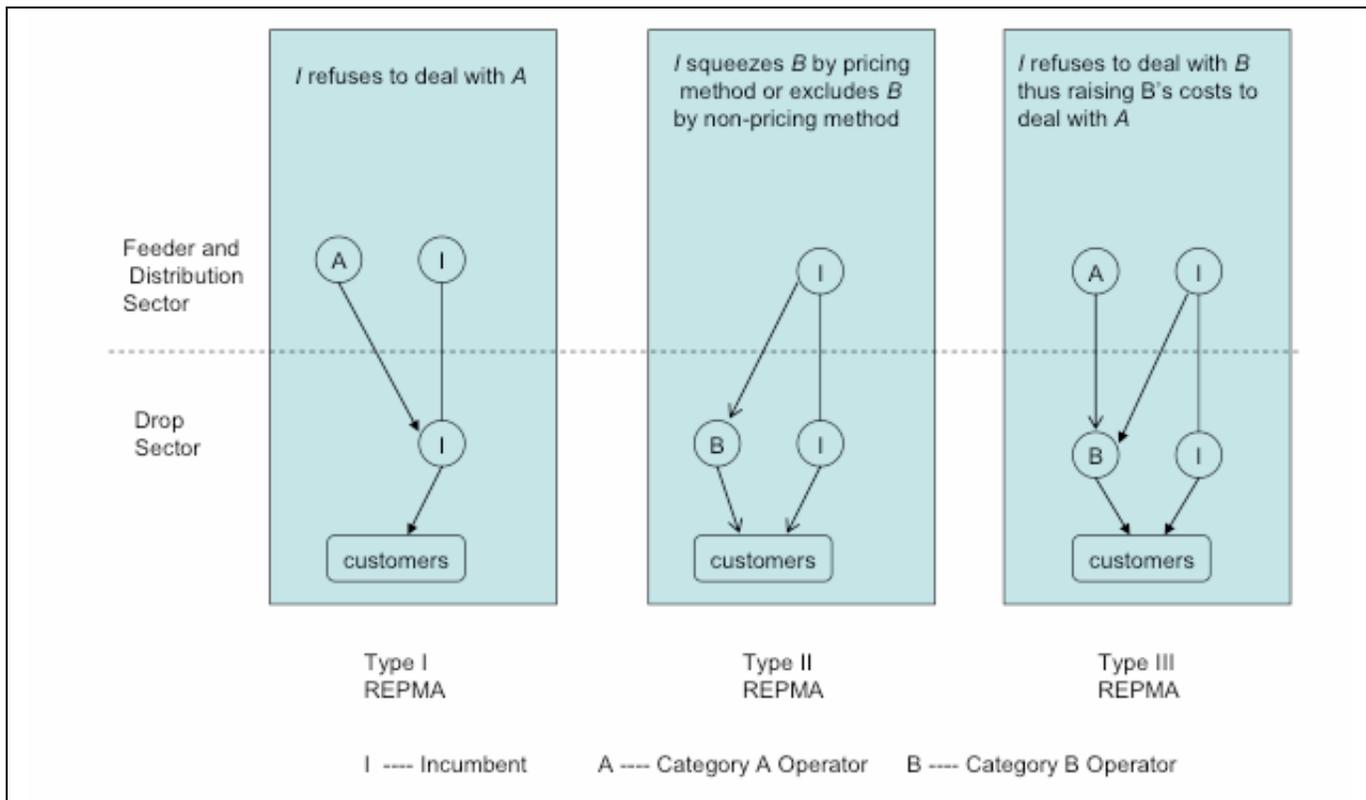


Figure 2. Suspected Anti-Competitive Strategic Behaviors

First, in those REMPAs (Type I) where the vertically integrated incumbent monopolizes the drop sector, the incumbent could refuse the interconnection requirement of Category A entrants between the incumbent's drop sector and Category A entrants' feeder and distribution sector (refusing to trade). Doing so may enable the incumbent to extract the whole of the profit as suggested by vertical foreclosure theory [see Armstrong et al., 1994; Laffont and Tirole, 2000; Rey and Tirole, 2007, for theoretical review and explanation].

Second, in those REMPAs (Type II) where a Category B has already entered the drop sector and whose relevant feeder and distribution sector is monopolized by the incumbent, the incumbent could reduce the retail price of its broadband access products and squeeze out Category B entrants, whose critical input was priced and controlled by

the incumbent (applying differentiated prices or other transactional terms to counterparties with equal standing). Alternatively, the incumbent could refuse (refusing to trade) or delay to interconnect with Category B operators categorically using one pretext or another. Moreover, if it did connect with the Category B operator, the incumbent could degrade the quality of the service that it provides (applying differentiated prices or other transaction terms to counterparties with equal standing) [see Armstrong et al., 1994; Laffont and Tirole, 2000, for theoretical review and explanation].

Third, in those REPMA's (Type III) where a Category B operator has already entered the drop sector and in whose relevant feeder and distribution sector the stronger incumbent competes with a weaker Category A entrant, the incumbent could refuse to deal, that is, refusing to trade with the Category B operator. Doing so reduces the supply that the Category B operator could seek, weakens its bargaining power, and thus raises its costs of dealing with the remaining supplier—the Category A entrant, to such an extent that the Category B operator can not profitably enter or remain in the market [see, for instance, Ordover et al., 1990; Armstrong et al., 1994; Rey and Tirole, 2007 for a discussion of the theory of raising the costs of rivals].

The challenge facing Category B entrants outside the thirteen trial cities is arguably worse than those that they face in the trial cities, as they are not permitted to expand the networks that they had established prior to the June 2001 Circular being issued. As such, they are placed at a significant commercial disadvantage vis-à-vis the Category A operators that they face. Furthermore, the three different situations outlined above are observable throughout China, that is, within the north and south of the country, as well as trial and non-trial cities alike, and supported by a substantial body of anecdotal evidence. With this in mind, the following three subsections will explore the instances of the aforementioned anti-competitive strategies from the perspectives of market concentration, investment and pricing.

Market Concentration

New entrants often allege that incumbent operators are acting anti-competitively. Indeed, it could be argued that such allegations are part of a game waged by the new entrant against the incumbent as it seeks to establish itself in the marketplace. It is, however, relatively rare for a new entrant to formalize such allegations. For example, while Wilsdon and Jones [2002] highlight the variety of complaints made by new entrants in the UK against BT, the incumbent operator, they also demonstrate how few of these were subsequently formalized. It is, therefore, both unusual and surprising that one Category B operator in northern China decided to formally complain about the behavior of the incumbent in early 2008. On January 8, 2008, Shandong San Lian Electronics Information Ltd (Shandong San Lian) complained to Shandong Communications Administration, which is the local arm of the telecommunications regulator, and again lodged a suit to a local court in January 2008, stating that the incumbent was acting anti-competitively [Anhui Legal System, 2008]. It argued that in April 2007 Jinan Netcom (the city arm of China Netcom—now China Unicom, the incumbent in northern China) offered Shandong San Lian customers the opportunity to spend just CNY600 for a fourteen-month 2Mbps broadband contract *if* they could produce a Shandong San Lian receipt. In other words, the incumbent offered the customers of Shandong San Lian a broadband connection at just CNY42.86 per month, a substantial discount when compared against its normal charges of CNY150 one-off fee and CNY70 per month. And, if this was not sufficient to entice customers, Jinan Netcom exempted any customer from the monthly fee in the remaining months if their Shandong San Lian contract was not terminated when they moved between the two operators [Anhui Legal System, 2008].

Both of these strategies sought to create a price differential by reducing retail prices thus squeezing (foreclosing) Shandong San Lian, whose essential input is priced by and obtained from Jinan Netcom. It was also alleged that Jinan Netcom sought to degrade the quality of interconnection between the two companies [Anhui Legal System, 2008]. The Director of Legal Affairs at Shandong San Lian alleged that combined these strategies were designed to force his company's exit from the market, thereby enabling Jinan Netcom to raise retail prices to end users in the longer term [Anhui Legal System, 2008]. It is worth noting that it was Shandong San Lian rather than Jinan Netcom (now Jinan Unicom) that first provided broadband access in Jinan city. In 2002, Shandong San Lian had substantially more subscribers than Jinan Netcom, but as a consequence of the suspected anti-competitive behaviors of Jinan Netcom this has been overturned. In 2002 Shandong San Lian controlled more than half of the broadband market, yet by the end of 2007 Jinan Netcom was the dominant service provider with almost three-quarters of the market.

Due to this reversal in fortune, Shandong San Lian was forced to seek inputs from a Category A entrant, which in this case was Jinan Telecom (after geographical separation, China Telecom is the incumbent in the south but a Category A entrant in the north), and ultimately sold its broadband operations to Jinan Telecom for CNY200 million in March 2008. After the sale of Shandong San Lian to Jinan Telecom, an out-of-court settlement was reached and the lawsuit subsequently withdrawn (*nolle prosequi*). This is not unusual, as Zhang and Zhang [2007, p. 195]

demonstrate in their discussion of the enforcement of the Anti-Monopoly Law, most litigants in China prefer to settle out of court settlement.

What is surprising here is that Shandong San Lian was forced into initially seeking inputs, and then exiting the market, in a trial city (Jinan) where it was able to further expand its presence in drop sectors due to its status as a Category B operator. This suggests that the competitive advantages that accrue from vertically integrated incumbency are significant and not easily, if at all, discounted by Category B operators. Of greater concern, however, is the implication of the fate of Shandong San Lian for the prospects of Category B operators outside the thirteen trial cities. Outside of these cities, Category B operators do not have the option of enhancing their competitiveness through expanding their own network. In other words, they must continue to rely on the network of Category A operators when delivering their own services. In doing so, they will remain at the mercy of any anti-competitive strategies that the incumbent chooses to implement and as such their prospects are not rosy—either they will continue in the market, but with their market share declining, or negotiate to sell their operations from a position of weakness.

As this example highlights the mechanism leading to the continued concentrated nature of broadband telecommunication markets, albeit within a specific trial city, an obvious question to ask is whether this is typical of other markets as well. An internationally used measure of market concentration is the Herfindahl-Hirschman Index (HHI), the calculation of which is based on the market share of operators. The Ministry of Industry and Information Technology and its predecessors have never disclosed nationwide market share for broadband by corporations, let alone disclose the market share by operators in various regions. In a nation where there are a few geographical markets and each of regional market is dominated or monopolized by one firm, it would misleadingly underestimate the market power of each firm if the market share of each regionally dominant firm *in the whole nation* was used to calculate HHI as a measure of market power. Instead, HHI as determined by the market share *in the regional market* monopolized or dominated by a particular operator provides a better indication of the degree of market power in these geographical markets [see Hirschey, 2009, ch.13].

Considering the two inherited regional nearly monopoly operators of the fixed line sector in China, it is thus more appropriate to use the HHI obtained by using market share in the south or north to illustrate the market power in China. Tables 2 and 3 present the HHI for the northern provinces of China between 2002 and 2007. The incumbent for this period was the then China Netcom Group Corporation (Hong Kong) Limited, the listed subsidiary of China Netcom Group (now China Unicom). In its annual reports it publishes market share data in the northern provinces where it provides service, enabling us to calculate both market shares and HHI in that region. When measured by subscribers, its market share grew from 86.50 percent in 2002 to 95.80 percent in 2004, with the consequence that HHI also increased from 7665 to 9195 over the same period.

Chinese operators adopted a strategy of creating a listed subsidiary that controlled their most profitable regional operations within China. The less profitable operations were retained by the parent company, thereby maximizing the amount of capital that would be raised when the subsidiary was listed on the overseas stock market. Over time, however, the listed subsidiaries have acquired more of the operations of the parent company [Fan, 2005]. China Netcom Group Corporation (Hong Kong) Limited took over the assets from its parent company China Netcom Group in four provinces in 2005 [China Netcom, 2006]. This takeover suggests that the HHIs after 2005 inclusive are indicators of a geographically wider market than those before 2005. That is, that the HHIs of 2002–2004 and those of 2005–2007 are not comparable. Having said this, the significant increase in HHI for 2002–2004 indicates that the market became highly concentrated during these three years. In other words, its dominant position in the broadband market increased. A significant factor contributing to this is illustrated by the aforementioned case of Shandong San Lian, namely, the incumbent's willingness and ability to affect a squeezing strategy (foreclosure) on new entrants in order to *weaken future competition*. Table 3 also shows that in the subsequent period from 2005 to 2007 the HHI increased slightly, suggesting that the incumbent was dominant and competition was weak during this period.

Taking the history of a series of restructuring in China's telecommunications industry into account, the market framework in the south is similar to that in the north. China Telecom, as the regional incumbent inherited the near monopoly of fixed lines in the south. As to the market power enjoyed by China Telecom, the incumbent in the south, we cannot obtain the HHI time-series due to a lack of available data. China Telecom Corporation Limited—the listed subsidiary of China Telecom Group—disclosed its broadband market share only for 2004 in a series of annual reports. In 2004, it controlled 92.6 percent (HHI = 8630) of the market in the areas where it provided service and *strengthened* its leading position [China Telecom, 2005, p. 14, Chinese version]. According to its 2003 annual report, it had *strengthened* its leading position in the broadband market. Further, its procurement cost of broadband equipment had *decreased 20 percent* in 2003 compared to those in 2002 [China Telecom, 2004, pp. 12–13, Chinese

Table 2: The Changes in APRU of China Netcom Group Corporation (Hong Kong) Limited 2001–2004 (inclusive)

Year	Revenue (CNY bn)	Subscriber (million)	Reported ARPU (CNY)	Estimated (CNY)			Market share	HHI
				APRU L	APRU M	APRU H		
2001	1.384	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2002	2.468	0.577	N/A	356.2	N/A	N/A	0.865	7482
2003	2.815	3.346	N/A	70.1	119.6	406.3	0.892	7957
2004	5.033	8.482	N/A	49.4	70.9	125.3	0.958	9178

N/A = not available

Source: The figures of revenue, subscribers, reported ARPU and market share are from China Netcom Corporation (Hong Kong) Limited (2005, 2006, 2007, and 2008); The figures of ARPU (estimated) are calculated by the authors by drawing these figures obtained from China Netcom Corporation (Hong Kong) Limited (2005, 2006, 2007, and 2008).

Table 3: The Changes in APRU of China Netcom Group Corporation (Hong Kong) Limited 2005–2007 (inclusive)

Year	Revenue (CNY bn)	Subscriber (million)	Reported ARPU (CNY)	Estimated (CNY)			Market share	HHI
				APRU L	APRU M	APRU H		
2005	7.289	11.036	N/A	55.0	N/A	N/A	0.876	7674
2006	9.916	14.429	66.3	57.3	64.9	74.9	0.875	7656
2007	13.835	19.768	67.4	58.3	67.4	79.9	0.889	7903

N/A = not available

Source: The figures of revenue, subscribers, reported ARPU and market share are from China Netcom Corporation (Hong Kong) Limited (2005, 2006, 2007, and 2008); The figures of ARPU (estimated) are calculated by the authors by drawing these figures obtained from China Netcom Corporation (Hong Kong) Limited (2005, 2006, 2007, and 2008).

version]. According to its 2007 annual report, it was the leading provider [China Telecom, 2008, p. 3, Chinese version]. The market share data of 2003 and the description in its 2003 and 2007 annual reports strongly indicate that similar incentives of foreclosing Category B entrants by China Telecom exist. The market concentration should be comparable to that in the north. If not, and this is unlikely, the issue of the incumbent's anti-competitive behaviors and the high degree of market concentration in the northern parts of China presents a significant policy issue that needs to be addressed.

Investment

Mainstream microeconomic theory, as outlined by Pindyck and Rubinfeld [2005], for example, states that one possible consequence of an operator being dominant in the marketplace is underproduction through less investment than if it were in a competitive market. This does not mean that a monopolist will reduce the investment in absolute terms. In order to obtain maximum profit, it will control output—through increasing or decreasing investment—at such a level so that its marginal cost is equal to its marginal revenue, which may increase or decrease as demand shifts. This type of underproduction is, according to theory, suboptimal socially, and the dominant operator's efficiency is not aligned with the public interest. Although the information that is in the public domain is limited, it is possible to comment on whether operators have increased or decreased their investment in broadband infrastructure and content. China Netcom Group Corporation (Hong Kong) Limited, for example, has increased its investment in broadband access and content in recent years. In 2005 it invested CNY7.3 billion in broadband, which was a slight increase on the amount invested in 2004, while broadband related capital expenditure grew from CNY3.6 billion to CNY4.9 billion between 2005 and 2006 [China Netcom Group, 2007]. Significantly, the proportion of total capital expenditure accounted for by broadband increased over the same period, thereby demonstrating its significance as a market to the company.

Such significant investment, however, has not resulted in the quickened pace of the delivery of faster products. For instance, up until 2007 China Netcom Group Corporation (Hong Kong) Limited did not offer any DSL-based products with a broadband speed of 8Mbps anywhere in China [China Netcom Group, 2008]. In September 2009, the fastest DSL mass market product available in Beijing was 8Mbps. This does not compare favorably with speeds in other major international cities: as Table 4 shows, substantially faster DSL-based products are available in Berlin, London, Moscow, Paris, Riyadh, Roman, Singapore, and Tokyo. Although there are several plausible explanations for the significant difference in broadband speeds between Beijing and the other cities mentioned, one possible explanation is that the investment that has been undertaken in China has focused on the geographical expansion of the network rather than on the provision of faster access speeds. As lower-speed DSL-based products do not require the extension of back-haul fibers, the incumbent operators are able to utilize the lower marginal costs of lower-speed

DSL-based products to efficiently add new subscribers to their networks. As a consequence, the incumbents are able to strengthen their position in the marketplace. However, the incumbent's efficiency is not aligned with the public interest, as the speeds of products provided by the incumbent are below those demanded by a significant portion of Chinese Internet users. A series of semi-annual Statistical Reports on the Internet Development in China released by the China Internet Network Information Center (CNNIC) show that a significant proportion of users are unhappy with the speed of access that they are receiving. In July 2007, for example, only 47.1 percent of those surveyed were happy with the access speed that they received [CNNIC, 2007, p. 44, English version].

Table 4: Illustrative Incumbents' DSL Broadband Products in Select Cities (September 2009)

City	Operator	Product ²	Subscription	Subscription	US\$/Mbps
		Mbps	Local	US\$ ⁵	
Sao Paulo	Telecom Brazil	0.256	49.9	27.1	105.8
Beijing	China Unicom ¹	0.512	129	18.9	36.9
New Delhi	BSNL	0.512	1125	23.1	45.1
Buenos Aires	Telecom Argentina	1	59.9	15.6	15.6
Washington	Verizon	1	19.99	20.0	20.0
Beijing	China Unicom ¹	1	138	20.2	20.2
Paris	France Telecom ⁴	1	24.9	35.6	35.6
Riyadh	STC	1	150	40.1	40.1
New Delhi	BSNL	1	3078	63.1	63.1
Beijing	China Unicom ¹	2	168	24.6	12.3
Berlin	Deutsch Telecom ³	2	29.95	42.8	21.4
Mexico City	Telmex	2	999	74.8	37.4
Singapore	Singapore Telecom	3	27.9	19.4	6.5
Beijing	China Unicom ¹	4	258	37.8	9.4
Buenos Aires	Telecom Argentina	5	95	24.7	4.9
Rome	Italia Telecom	7	19.95	28.5	4.1
Washington	Verizon	7.1	39.99	40.0	5.6
Tokyo	NTT EAST	8	2782	29.9	3.7
Sao Paulo	Telecom Brazil	8	99.9	54.2	6.8
Riyadh	STC	8	240	64.2	8.0
Beijing	China Unicom ¹	8	498	72.9	9.1
Moscow	COMSTAR	10	800	25.3	2.5
Singapore	Singapore Telecom	15	59.9	41.7	2.8
Berlin	Deutsch Telecom	16	49.95	71.4	4.5
Paris	France Telecom	18	39.9	57.1	3.2
Moscow	COMSTAR	20	1000	31.7	1.6
Rome	Italia Telecom	20	24.95	35.7	1.8
London	British Telecom	20	24.46	40.1	2.0
Riyadh	STC	20	310	82.7	4.1
Tokyo	NTT EAST	47	2940	31.6	0.7

1 = China Unicom acquired China Netcom in the latest restructuring completed in late 2008 and early 2009.

2 = The products with unlimited usage are chosen.

3 = The price of 2Mbps of Deutsch Telecom includes unlimited domestic calls.

4 = The price of 1Mbps of France Telecom includes unlimited TV and that of 18Mbps of France Telecom includes unlimited domestic calls.

5 = The exchange rates are used to convert the monthly subscriptions to US dollar. Those exchange rates are adopted on www.ft.com except that of Saudi Arabia that is adopted from www.ameinfo.com/currency/ on September 6, 2009.

Source: Compiled by the authors from the websites of operators involved.

Pricing

The high concentration of a market often results in the dominant company imposing higher prices onto the market. Table 4 presents the broadband access prices in select cities. In Table 4, broadband prices are organized by speed and then, where there are multiple examples of the same speed, by price in U.S. dollars per Mbps. To facilitate comparison, only recurring monthly subscriptions charges of the incumbent's DSL-based products with unlimited usage are included. Beijing, which is dominated by China Unicom (formerly China Netcom), is among the most expensive cities in the world. For example, subscribers in Beijing pay \$72.92 per month for a broadband connection with a speed of 8Mbps. With almost the same budget, it is possible to subscribe to much higher speed products in



Berlin, London, Moscow, Paris, Rome, Singapore, Tokyo, and Washington. For the entry-level 1Mbps product, the price is higher in Beijing than in Buenos Aires or Washington. There would also appear to be a relationship between price per Mbps and the position of China Unicom (formerly China Netcom) internationally. As speeds increase, China Unicom becomes more expensive and thus compares less favorably with the foreign cities listed on Table 4. The high prices are due to the lack of competition. This observation is corroborated by a report released in August 2010 by The Department of Information Research of The State Information Centre of China. The report found that nationally the average monthly broadband access charge per subscriber in 2008 was 83.8 RMB. This amounts to 46.6 RMB (US\$6.7) per Mbps per month, or eighteen times the figure in South Korea (US\$0.37) and 51.5 times the figure in Japan (US\$0.13) [State Information Centre, 2010].

If a company does not feel the effects of competitive pressures in a market, it is able to leave its retail prices largely unchanged. (It is, however, worth noting that there is a possibility that, in order to maximize aggregate profits, the incumbent may adjust prices of existing products after or when the incumbent introduces similar but not identical products onto the market. For a discussion of the theory on price discrimination by dominant firms see, for example, Church and Ware [2000: Chapter 5]). Table 5 shows the average first-year monthly cost to a subscriber who had a fixed line with the incumbent prior to taking a twelve-month broadband contract in the large northern Chinese cities. Besides monthly subscription, the table takes into account one-off installation fees as well as other charges and spreads them over the yearlong contract period. While some data may be missing and some data of higher-speed products unavailable in the years before they were introduced onto the market, it is clear from Table 5 that although retail prices declined substantially between 2002 and 2004, since then their decline has slowed or effectively ceased. We can see from Beijing that the price of the slowest speed product has fallen just once, in the year after its introduction, and has remained stable from 2003 onward. In subsequent years, faster products have been introduced, but they have also seen only minimal price reductions. Thus, not only are DSL-based products comparatively slow to emerge onto the market, especially when compared internationally, but also prices do not appear to be subject to either competitive or regulatory downward pressures. As DSL equipment costs did decrease over this period, the end result would appear to be a widening of the margins as acknowledged in China Netcom Group Corporation (Hong Kong) Limited's own annual reports [China Netcom Group, 2006 and 2007].

In some cities, such as Beijing and Tianjin, prices have been more or less stable between 2005 and 2009, while in other cities, like Qingdao, there has been a slight increase, and in Shijiazhuang there has been a slight decline. If we consider the reduced cost of equipment and the incumbent's possible strategy of adjusting the price of existing products after it introduces similar but not identical products in order to maximize aggregate profits, such price changes support the suggestion that the incumbent, through implementing pricing or non-pricing strategies between 2002 and 2004, was able to enhance its position in the marketplace to such an extent that only marginal changes were required in subsequent years. An interesting city is Shenyang, where prices did decrease quite substantially. One possible explanation could be the presence of competition, while a second is that the incumbent's local arm in Shenyang is implementing its price reduction strategy later than the incumbent's local arms elsewhere in other cities. Regardless, the unusual nature of developments in Shenyang merits further investigation.

Average revenue per unit (ARPU) is a commonly used measure to show how much revenue each subscriber (broadband subscriber in this case) generates on a monthly basis. ARPU data for the northern provinces that China Netcom Group Corporation (Hong Kong) Limited served are a better proxy for the overall price level in terms of representativeness of the entire geographical market we are interested in than are the individual prices of selected products in several cities when an incumbent provides multiple products. To observe the relationship of ARPU and HHI of the same periods enhances the robustness of our analysis (above). Tables 2 and 3 show ARPU levels for China Netcom Group Corporation (Hong Kong) Limited. ARPU L in Tables 2 and 3 is calculated by dividing the broadband revenue of a given year by the number of total broadband subscribers at the end of that year and then dividing by twelve, whereas ARPU H is obtained by dividing the broadband revenue of a given year by the number of total subscribers at the end of its previous year and then dividing by twelve. ARPU M is achieved by dividing the broadband revenue of a given year by the average of the numbers of the given and previous year, then dividing by twelve.

The weighted ARPU, which cannot be calculated as monthly subscriber data and are not available, should be located between APRU L and H and is likely to be located between APRU L and M due to stronger demand in the second half of each year in China. All three measures of ARPU fall between 2002 and 2004, but then remain stable thereafter. Since no market share data for years prior to 2002 are available and the market share data of 2002–2007 (inclusive) in the public domain is yearly, we unfortunately do not have a sufficient number of observations to support a regression analysis of the relationship between HHI and price. Having said this, Tables 2 and 3 do point toward the following hypothesis: that the strategies adopted by the incumbent initially squeezed its competitors by reducing its retail prices, as well as by other anti-competitive behaviors discussed in previous sections. These strategies resulted in the market's HHI increasing between 2002 and 2004 and weakened the future competition, since

competitors were squeezed. Subsequently, after the market had been further concentrated and competition had been weakened in favor of the incumbent, it was able to maintain prices and slightly increase its market share between 2005 and 2007. To date we have not found any data or evidence to categorically falsify this hypothesis.

Table 5: Average Per Month Cost (CNY) in the First Year of Broadband Products of China Netcom in Illustrated Northern Cities

City	Product	Year							
		2002	2003	2004	2005	2006	2007	2008	2009
Beijing*	512Kbps	190	145	145	145	145	145	145	145
	1Mbps			175	175	175	163	163	163
	2Mbps						213	193	193
	4Mbps						283	283	283
	8Mbps							523	523
Tianjin	512Kbps	136.7			117			117	
	1Mbps				247			247	
	2Mbps				347			347	
	4Mbps				437			437	
Changchun	512Kbps			83.3				75	
	1Mbps			125		83.3	83.3	83.3	70.4
	1.5Mbps						108	108	90
	2Mbps						117		108.3
	3Mbps								116.7
Shenyang	4Mbps								133.3
	512Kbps				108	108	108	96.3	73.3
	1Mbps					128	128	98.3	75
	2Mbps						236	118	83.3
Dalian	3Mbps								91.6
	4Mbps								100
	512Kbps					66.7	65	66.7	66.7
Shijiazhuang	1Mbps					120	65	75	75
	2Mbps							91.7	91.7
Jinan*	512Kbps	95				75		60	60
	2Mbps						75	50	50
Qingdao*	768Kbps				40	47.3	52.1	53.3	
	1Mbps						58.3	58.3	73.3
	2Mbps				60	67.3	60.8	73.3	88.3
	3Mbps						88.3	88.3	103.3
Qingdao*	4Mbps								148.3
	512Kbps	141.7				86.8		93	93
	1Mbps					109	115	115	115
Qingdao*	2Mbps					159			165
	3Mbps								213

Those cities marked with * are among the 13 cities stipulated in the June 2001 Circular. China Netcom was taken over by China Unicom in the late 2008 and early of 2009; In addition to monthly subscription, other costs including one-off installation fee and/or DSL modem charge are considered in this table.

Source: Collected and calculated by the authors from a variety of Internet sources

Rather, drawing on industrial organization theories relating to the anti-competitive foreclosure strategies of vertically integrated incumbents, the market framework resulting from the restructuring and the June 2001 Circular, and investment and pricing activity described above all support the aforementioned hypothesis.

V. CABLE SYSTEMS AND THIRD GENERATION MOBILE

Technologically, cable television network, if updated, can provide broadband services. In some parts of the world, such as in the U.S., cable operators are the main rivals to telecommunications operators. In China, The Ministry of Industry and Information Technology (and its predecessors) oversees the telecommunications industry, but the cable operators network industry is under another ministerial-level agency—The State Administration of Radio, Film and Television, or SARFT. In January 2010, The State Council of China declared that it would promote the convergence of telecommunications, the Internet and cable television [Wang, 2010]. This announcement repealed a Circular issued in 1999 that prohibited cable systems from entering telecommunications markets and vice versa



[General Office of the State Council, 1999]. The ministries involved have selected trial cities, which are presently in the process of developing these trials, where cable operators will be allowed to provide broadband service and telecommunications operators IPTV. Given the propensity of China to trial before acting [Gao and Lyytinen, 2000], a plausible speculative conclusion is that, in due course, these trials will be extended to other parts of China. The updating of cable systems requires considerable time and resources, and this may not happen on a significant scale for several years. However, the declaration of The State Council to promote convergence has brought about proactive reactions by incumbents to potential competition from cable systems. On March 17, 2010, The Ministry of Industry and Information Technology, National Development and Reform Commission, and five other ministries or ministerial-level agencies jointly issued the *Announcement on Promoting Optical Broadband Network Rollout*, stipulating a target that by the end of 2011 the average bandwidth of broadband residential subscribers in urban area should reach 8Mbps, 2Mbps in rural area, and 100Mbps for business customers [MIT et al., 2010].

The announcement and joint ministerial intervention suggest that competition has not developed as anticipated. Not only are there fewer than expected companies operating in the broadband market, but the products that they offer are deemed to be unsatisfactory. Evidence is beginning to emerge to suggest that broadband operators are amending their strategies; in May 2010 it was reported that China Telecom Group would update its plans so that 12Mbps and not 4Mbps speed connections would be available to 70 percent of towns [Economic Reference Daily, 2010]. Time and resources aside, the pace of broadband provision by cable systems critically depends on the interconnection of cable systems with the outside of China through nationwide backbone and international gateways, which are either dominated or duopolized by the incumbents. According to the analysis in Section IV, incumbents may have incentives and capabilities to foreclose cable systems.

The third-generation (3G) mobile licenses were awarded to the three main operators at the beginning of 2009. This licensing followed the latest restructuring that was announced in May 2008 and completed in January 2009. The effect of this latest restructuring and 3G licensing on broadband is not clear-cut. It may increase competition among the remaining three nationwide operators through inter-platform (3G versus fixed broadband) or intra-platform (fixed broadband versus fixed broadband) through creating bundling service (3G, fixed broadband, and so forth).

The competition among the remaining three nationwide operators may be enhanced. The prospect of Category B entrants seems more obscure than previously. On the one hand, the restructuring has consolidated backbone and municipality access network market. It edges the Category B entrants toward a more weakened position. If no intervention emerges, the anti-competitive strategic behaviors employed by incumbents may continue to squeeze Category B entrants out of the market. The 3G licensing, which was not by an auction, provides three nationwide operators a new competitive weapon—the ability to bundle fixed broadband with landline and 3G (mobile). This horizontal integration may force those Category B entrants, who were not granted 3G licenses by the regulators, to exit the market if no further interventions are made. Fu [2010], a blogger officially working for Shenzhen Media Group that runs the local cable system in Shenzhen City, quoted a research report published by Guideline Research, a consulting company specializing in digital television and marketing research, that there had been only 2.31m cable modem broadband subscribers in China by March 2009 (compared to 88.13m for the two incumbents combined). More recently, in January 2010, cable broadband subscribers accounted for less than 3 percent of the market nationally. Apart from the cable television operators' own issues, such as insufficient resources, Fu [2010] identified the bundling strategy of incumbents as one of the reasons that cable operators have lost market share in the broadband market to telecommunications operators. The broadband market share of Shenzhen Media Group quickly decreased from 33 percent in 2006 to 7.5 percent in 2009. We have already discussed one of the other reasons identified by Fu [2010], namely, the dependence of cable operators on the incumbents when interconnecting with the Internet backbone. It indicates that the incumbents might abuse its vertical integration advantage and horizontal bundling with mobile services to foreclose cable operators. These perverse incentives have to be addressed in one way or another in order to promote convergence declared by the State Council.

VI. CONCLUSION

The growth of broadband in China and the central role that it plays as a means to access the Internet, raises the issue as to whether or not the market could be protected from the anti-competitive behaviors of incumbents. If the market could be developed competitively, then consumers will be able to enjoy wide ranging benefits: prices would fall, new products would be regularly launched onto the market, and subscribers would be able to move freely between service providers. We have shown that there is a gap between the announced policy objective of promoting competition and the reality of developments in the broadband sector.

It has also been shown that the incumbents are suspected of foreclosing Category B entrants. Although the market has been restructured several times to enhance competition, the restructuring in 2002 and the June 2001 Circular created a market structure in which the two incumbent operators have incentives to act anti-competitively. That China Telecom and China Netcom (now China Unicom) remain dominant in the delivery of broadband services of

their respective areas after a series of restructurings is somewhat surprising, given that restructurings were underpinned by a desire on the part of the government to enhance competition across the telecommunications industry. As recently as 7 May 2010, The State Council of China issued a Circular, stating:

[The State] shall encourage the private sector to take part in investing in telecommunications construction. [The State] shall encourage private capital to enter the basic telecommunications service markets as shareholders. [The State] shall support private capital to operate value added services. [The State] shall strengthen the supervision of telecommunications monopoly and anti-competitive behaviors. [The State] shall facilitate fair competition and promote the share of resources [State Council, 2010].

So far industry-wide restructurings have failed to deliver a more competitive broadband sector. This failing indicates that restructuring alone cannot guarantee or promote sustained competition. Indeed, restructuring needs to be complemented by other measures that counteract or deter the anti-competitive behavior of incumbent operators with market power and ensure that new entrants are placed on an equal footing with them. One such mechanism might be to impose some form of disintegration on the dominant broadband providers in a similar fashion to the UK's imposition of functional separation on BT. Though short of ownership separation, this would enable Category B entrants to access the infrastructure of the two dominant providers on a more equitable footing.

In addition to ex ante regulation, another mechanism would be to apply China's anti-monopoly law, which has been in force since August 2008, to the telecommunications industry. The enforcement of the anti-monopoly law with serious ex post penalties may be able to protect the market from being abused by two dominant operators through using their vertical (now horizontal as well) integration anti-competitively. How to effectively apply the Anti-Monopoly Law deserves further research, not least because some of the literature mentioned in Section 2 casts doubt on the overall effectiveness of the law. Either option would require a more detailed analysis of the Chinese telecommunications market to be undertaken, thereby moving away from the macro-level discussion associated with, say, Fan [2005] or Gao and Lyytinen [2000], toward one that identifies the enduring bottlenecks within the network that are central to the anti-competitive behaviors of the two dominant operators. This move away from the macro-level indicates that further research, at the city or sub-city geographical scale, is needed to expand and deepen our knowledge of the structure and nature of competition in China's telecommunications industry.

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REFERENCES

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Anhui Legal System (2008) "Broadband Competition Becomes White Heat: Bailing Sues Jinan Netcom", <http://www.anhuilaw.com> (current May 4, 2010).

Armstrong, M., S. Cowan, and J. Vickers (1994) *Regulatory Reform: Economic Analysis and British Experience*, Cambridge, MA: MIT Press.

Benkler, J. (2010) *Next Generation Connectivity*, February, The Berkman Centre for Internet and Society, Cambridge, MA: Harvard University.

China Internet Network Information Center (2007) *Statistical Survey Report on the Internet Development in China (July) (English Version)*, <http://www.cnnic.cn> (current May 4, 2010).

China Netcom Group Corporation (Hong Kong) Limited (2005) *2004 Annual Report*, Hong Kong SAR, China.

China Netcom Group Corporation (Hong Kong) Limited (2006) *2005 Annual Report*, Hong Kong SAR, China.

China Netcom Group Corporation (Hong Kong) Limited (2007) *2006 Annual Report*, Hong Kong SAR, China.



- China Netcom Group Corporation (Hong Kong) Limited (2008) *2007 Annual Report*, Hong Kong SAR, China.
- China Unicom (Hong Kong) Limited (2009) *2008 Annual Report*, Hong Kong SAR, China.
- China Telecom Corporation Limited (2003) *2002 Annual Report*, Hong Kong SAR, China.
- China Telecom Corporation Limited (2004) *2003 Annual Report*, Hong Kong SAR, China.
- China Telecom Corporation Limited (2005) *2004 Annual Report*, Hong Kong SAR, China.
- China Telecom Corporation Limited (2006) *2005 Annual Report*, Hong Kong SAR, China.
- China Telecom Corporation Limited (2007) *2006 Annual Report*, Hong Kong SAR, China.
- China Telecom Corporation Limited (2008) *2007 Annual Report*, Hong Kong SAR, China.
- China Telecom Corporation Limited (2009) *2008 Annual Report*, Hong Kong SAR, China.
- China Telecom Corporation Limited (2010) *2009 Annual Report*, Hong Kong SAR, China.
- Church, J. and R. Ware (2000) *Industrial Organization: A Strategic Approach*, New York, NY: McGraw-Hill.
- Economic Reference Daily (2010) "The Bandwidth of Broadband Subscribers of China Telecom Group in Cities and Towns Will Increase Six Times" (in Chinese), Apr. 21, <http://it.people.com.cn> (current May 4, 2010).
- Fan, Q. (2005) "Regulatory Factors Influencing Internet Access in Australia and China: A Comparative Analysis", *Telecommunications Policy* (29)2–3, pp. 191–203.
- Fu, F. (2010) "Situations and Challenges That Cable Television Industry Are Facing" (in Chinese), Apr. 21, <http://blog.sina.com.cn> (current May 4, 2010).
- Gao, P. and K. Lyytinen (2000) "Transformation of China's Telecommunications Sector: A Macro Perspective", *Telecommunications Policy* (24)8–9, pp. 719–730.
- General Office of the State Council (1999) *Circular Transmitting Opinions of the Ministry of Information Industry and the State Administration of Radio, Film and Television on Strengthening the Construction and Management of Radio and Television Cable Networks* (in Chinese), Sept. 17, <http://vip.chinalawinfo.com> (current May 4, 2010).
- Harwit, E. (2008) *China's Telecommunications Revolution*, Oxford, UK: Oxford University Press.
- Hirschey, M. (2009) *Managerial Economics, 12th edition*, Florence, KY: South-Western College Pub.
- Howick, S. and J. Whalley (2008) "Understanding the Drivers of Broadband Adoption: The Case of Rural and Remote Scotland", *Journal of the Operational Research Society* (59) August, pp. 1299–1311.
- International Telecommunications Union (2003) *The Birth of Broadband*, Geneva, Switzerland: ITU.
- International Telecommunications Union (2007) *Trends in Telecom Reform 2007—The Road to Next-Generation Networks (NGN)*, Geneva, Switzerland: ITU.
- Internet Society of China and China Internet Network Information Centre (2002) *The Report of Development of the Internet in P.R. of China*, Beijing, China: Posts and Telecom Press.
- Laffont, J.J. and J. Tirole (2000) *Competition in Telecommunications*, Cambridge, MA: MIT Press.
- Lam, P.-L. and A. Siu (2009) "Productivity Analysis of the Telecommunications Sector in China", *Telecommunications Policy* (32)8, pp. 559–571.
- Li, G. (2009) "Can the PRC's New Anti-Monopoly Law Stop Monopolistic Activities? Let the PRC's Telecommunications Industry Tell You the Answer", *Telecommunications Policy* (33)7, pp. 360–370.
- Liu, Jiayi (2008) *Work Report on the Audit of the Implementation of the Central Budget and Other Fiscal Revenues and Expenditures in 2007*, 4th Plenary Session of the 11th People's Congress Standing Committee, Aug. 27, Beijing.
- Loo, B.P.Y (2004) "Telecommunications Reforms in China: Towards an Analytical Framework", *Telecommunications Policy* (28)9–10, pp. 697–714.
- Ministry of Industry and Information Technology, National Development and Reform Commission and Ministry of Finance (2008) *The Announcement on Deepening Telecommunications System Reform*, May 24, www.miit.gov.cn (current May 4, 2010).
- Ministry of Industry and Information Technology, National Development and Reform Commission, Ministry of Science and Technology, Ministry of Finance, Ministry of Land and Resources, Ministry of Housing and Urban-

- Rural Development, and State Administration of Taxation (2010) *The Announcement on Promoting Optical Broadband Network Rollout*, Mar 17, www.miit.gov.cn (current May 4, 2010).
- Ministry of Information Industry (2001) *The Circular of Undertaking Trials of Opening Markets of Network of Residence* (in Chinese), June 1, <http://www.law-lib.com> (current May 4, 2010).
- Ministry of Information Industry (2002) *The Guidelines of Telecommunications Development of P.R. of China*, Beijing, China: Posts and Telecom Press.
- Ministry of Information Industry, National Development and Reform Commission and Ministry of Finance (2000) *Circular on Structural Adjustment of Telecommunication Charges*, Dec., Beijing, China.
- Ministry of Posts and Telecommunications (1993) *The Provisional Administration of Examination and Approval for Engaging in Deregulated Telecommunications Industry: Tentative Procedures*, www.lexiscn.com (current May 4, 2010).
- National People's Congress of the People's Republic of China (2007) *Anti-Monopoly Law of the People's Republic of China* (translated in English), <http://www.china.org.cn> (current May 4, 2010).
- OECD (2009) *Communications Outlook 2009*, Paris, France: OECD.
- Ofcom (2005) *Final Statement on the Strategic Review of Telecommunications, and Undertakings in Lieu of a Reference Under the Enterprise Act 2002*, London, UK: Office of Communications.
- Ordover, J.A., G. Saloner, and S.C. Salop (1990) "Equilibrium Vertical Foreclosure", *American Economic Review* (80)1, pp. 127–142.
- Owen, B.M., S. Su and Wentong Zheng (2008) "China's Competition Policy Reforms: The Antimonopoly Law and Beyond", *Antitrust Law Journal* (75)1, pp.14–15.
- Pindyck, S.R. and L.D. Rubinfeld (2005) *Microeconomics, 6th edition*, Upper Saddle River, NJ: Prentice Hall.
- Rey, P. and J. Tirole (2007) "A Primer on Foreclosure" in Armstrong, M. and R. Porter (eds.) *Handbook of Industrial Organization*, Amsterdam, The Netherlands: North-Holland.
- State Council (2010) *Several Opinions on Encouraging and Guiding the Healthy Development of Private Capitals* (in Chinese), May 7, <http://www.gov.cn> (current May 4, 2010).
- State Information Center (2010) *Toward Information Society: The Development Report of Information Society of The People's Republic of China 2010* (in Chinese), Beijing, China: State Information Center.
- Tan, Z.A (2002) "Product Cycle Theory and Telecommunications Industry—Foreign Direct Investment, Government Policy, and Indigenous Manufacturing in China", *Telecommunications Policy* (26)1–2, pp. 17–30.
- Tan, Z., W. Foster, and S. Goodman (1999) "China's State-Coordinated Internet Infrastructure", *Communications of the ACM* (42)6, pp. 44–52.
- TeleGeography (2010) "Trio of Telcos Report Year End Users", *TeleGeography*, Jan. 20, www.telegeography.com (current May 4, 2010).
- Wang, X. (2010) "Convergence Moves to Bolster Investments (in English)", *China Daily*, Feb. 5, <http://www.chinadaily.com.cn> (current May 4, 2010).
- Wilsdon, J. and D. Jones (2002) *The Politics of Bandwidth: Network Innovation and Regulation in Broadband Britain*, London, UK: Demos.
- Xia, J. and T.-J. Lu (2008) "Bridging the Digital Divide for Rural Communities: The Case of China", *Telecommunications Policy* (32)9–10, pp. 686–696.
- Xu, Y. and D. Pitt (2002) *Chinese Telecommunications Policy*, Boston, MA: Artech House.
- Xu, Y., D. Pitt, and N. Levine (1998) "Competition Without Privatization: The Chinese Path" in Macdonald, S. and G. Madden (eds.) *Telecommunications and Social-Economic Development*, London, UK: Elsevier.
- Yu, L., S. Berg, and Q. Guo (2004) "Market Performance of Chinese Telecommunications: New Regulatory Policies", *Telecommunications Policy* (28)9–10, pp. 715–732.
- Yuan, Y. et al. (2006) "Xiaolingtong Versus 3G in China: Which Will Be the Winner?" *Telecommunications Policy* (30)5–6, pp. 297–313.
- Zhao, Y. (2000) "Caught in the Web: The Public Interest and the Battle for Control of China's Information Superhighway", *Info* (2)1, pp. 41–66.

- Zhang, B. (2001) "Assessing the WTO Agreements on China's Telecommunications Regulatory Reform and Industrial Liberalization", *Telecommunications Policy* (25)7, pp. 461–483.
- Zhang, B. (2002) "Understanding China's Telecommunications Policymaking and Reforms: A Tale of Transition Towards Liberalization", *Telematics and Informatics* (19)4, pp. 331–349.
- Zhang, X. and V.Y. Zhang (2007) "The Anti-Monopoly Law in China: Where Do We Stand?" *Competition Policy International* 3(2), Autumn, pp.184–201.

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