Price Regulation Induced Entry in China Mobile Telecom Market

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Abstract: The informal entry of Personal Handy Phone System (PHS) has reflected many problems of price regulation in China mobile telecommunication market — price regulation induced nominal price rigidities, nominal price rigidities induced informal entry of PHS, and informal entry of PHS induced efficiency loss. Because National Regulatory Authority (NRA) has not adjusted the approaches, objectives, and rate of return of price regulation duly according to the development of China mobile telecommunication industry, there were price rigidities in China mobile telecom market before PHS had entered. Price rigidities let mobile telecommunication market become an unsustainable contestability market. Because of price regulation partly, the competition in mobile telecommunication market of China was distorted.

Keywords: Regulation, Price Rigidities, Entry.

1. INTRODUCTION

Up to May 2004, the users of Personal Handy Phone System (PHS) in China have been 50 millions, in which 33 millions users belong to CHINA TELECOM and 17 millions users belong to CHINA NETCOM. While PHS entered mobile telecommunication market gradually, National Regulatory Authority (NRA) limited it early, acquiesced in it later, and awarded no license finally. Though there were two mobile telecommunications licenses in China only, but PHS had serviced a good many of users that exceeded that of CHINA UNICOM, provided with roaming functions, had become the third mobile telecommunication network actually.

Recently, the China telecommunication industry is developing rapidly. But the relevant academic research is not sufficient and many critical supervising policies and decisions under implementation or under development were conducted without clear applicable economic theories. The informal entry of PHS has reflected many problems of price regulation in China mobile telecommunication market — price regulation induced nominal price rigidities, nominal price rigidities induced informal entry of PHS, and informal entry of PHS induced efficiency loss.

2. PRICE REGULATION INDUCING NOMINAL PRICE RIGIDITIES

From Adam Smith (1776) to Ronald Coase (1945), the classic economics theory had
pointed that those enterprises which average cost exceeds marginal cost because of excessive fixed cost would loss, if they set price based on the marginal cost. So NRA had chosen Rate of Return Regulation among approaches of price regulation. Because NRA has not adjusted the approaches, objectives, and rate of return of price regulation duly according to the development of China mobile telecommunication industry, there were price rigidities in China mobile telecom market before PHS had entered.

2.1. lag of adjusting the approaches of price regulation

Price regulation has existed for a long time although it had changed over time as the market structure has changed from monopoly to competition. According to the experience of developed countries, the approaches of price regulation can usually be categorized into three groups: discretionary price, rate-of-return regulation, and cap regulation (Laffont 2000). Discretionary price is widely used when government operates the network to promote consumer-to-consumer equity objectives. For developing countries including China, which generally lack strong regulatory institutions, creating and staffing a regulatory agency that can perform ROR regulatory functions competently would be costly and take considerable time.

In 1997, the State Council issued No.39 bill (“The reply of solving development problem of China United Telecommunications Corporation”) that allowed China Unicom setting mobile telecommunication charge 10 percent under standard of regulation. China Unicom extended market share rapidly (Table 1), and had become the third largest mobile telecom carriers in the world in 2003 and a powerful competitor in duopoly mobile telecom market of China.

<table>
<thead>
<tr>
<th>Users(ten thousand)</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>China Unicom</td>
<td>142</td>
<td>521</td>
<td>1874</td>
<td>4100</td>
<td>6817</td>
</tr>
<tr>
<td>China Mobile</td>
<td>1874</td>
<td>3829</td>
<td>8526</td>
<td>14482</td>
<td>20700</td>
</tr>
<tr>
<td>Market share of China Unicom</td>
<td>7.04%</td>
<td>11.98%</td>
<td>18.02%</td>
<td>22.06%</td>
<td>24.77%</td>
</tr>
</tbody>
</table>


Because the structure of mobile communications market of China has been an oligopoly which means a partly competitive and partly regulated market with two operators, price cap regulation may be more feasible than ROR regulation — developing countries are well advised to avoid rate-of-return regulation altogether and to leapfrog to price caps. Adjustment of approaches to price regulation in China has been lagged.

2.2. lag of adjusting the objectives of price regulation

The objective of price regulation can usually be categorized into three groups: financing objectives (to make operators get sufficient revenue to be viable), efficiency objectives (to reflect resource scarcity properly and to maximize the productivity), and equity objectives (to distribute the welfare benefits between operators and consumers, and also among different consumer groups fairly).
In China, besides the former three objectives, accumulating funds was an important objective of price regulation, which stemmed from the chronic lack of telecommunications infrastructure and the very ambitious expansion plans. In a genuinely free market, prices are signals of supply and demand, but in China prices traditionally have not been signals, or rather they have been signals of political decisions governing the allocation of resources.

The most important objective in China had been to build network infrastructure to meet unsatisfied demand, which required a very large capital investment which came from high level telecommunication charge partly. Concerns about the inefficiencies of ROR regulation arose after extensive networks had been constructed.

2.3. lag of adjusting the price level of regulation

In 1996, the former MPT issued a bill (issues No. 1068), declaring that basic monthly rent of mobile telecommunications was ¥50, basic telecommunication charges was ¥0.40 per minute, and basic roaming communication charges was ¥0.60 per minute. Although NRA had adjusted telecommunication charges on other charge list, the basic charge rate had never been adjusted (Table 2), because of lack of regulation experience, lack of cost information of common carriers, and change of organization of NRA.

Table 2
Principal regulation bill of mobile telecommunication charges

<table>
<thead>
<tr>
<th>Date</th>
<th>NRA</th>
<th>Document</th>
<th>Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>State Planning Commission; Ministry of Posts and Telecommunications</td>
<td>“Notice of Strengthening the Administration of the Telecommunications charges”</td>
<td>issues 1993</td>
</tr>
<tr>
<td>1997</td>
<td>State Planning Commission; State Economic &amp; Trade Commission; Ministry of Posts and Telecommunications;</td>
<td>“Regulations of mobile telecommunication charges Administration”</td>
<td>Issues 2517</td>
</tr>
<tr>
<td>2000</td>
<td>the State Council</td>
<td>“Telecommunications Regulations, PRC”</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>State Planning Commission; Ministry of Information Industry</td>
<td>“Application procedure of telecommunications charges”</td>
<td></td>
</tr>
</tbody>
</table>

In June 2004, Ministry of Information Industry (MII) and State Development Planning Commission (SDPC) of China issued the No.204 Bill — “Notice of strengthening supervising measures of telecommunication charges”, emphasizing that started from July 1st, 2004, no telecom enterprises should propagandize and implement those standards of telecommunication charges not approved by the supervising department. The No. 204 bill implied that the price regulation of mobile telecommunications charge had evolved into price rigidities on telecommunication market.
3. **PRICE RIGIDITIES INDUCED INFORMAL ENTRY**

Despite CHINA TELECOM as a fixed-line carrier had got a mobile telecom license never, it had entered mobile telecom market actually, and chose a kind of laggard technology. The theory of industry organization had studied many models of entry about new entrants (Tirole 1988), but the entry of CHINA TELECOM had brought many practical argumentations. Though CHINA TELECOM had to break entry barriers before entered mobile telecom market, the high level price of ROR gave it a hand. Price rigidities let mobile telecommunication market become an unsustainable contestability market, limited the strategy of limit pricing of the mobile communications carriers, and let the predatory pricing become an unbelievable threaten.

For describing the competition between mobile telecom carriers and fixed-line carriers, we assumed that there were a representative incumbent operator which had massive fixed cost, let it be $C_f$, less variable cost, let it be $C_v$.

The cost $(C(q))$ of the operator may be written by:

$$C(q) = C_f + C_v Q$$

$$\Pi^m = \max[(P - C_v)Q]$$

Where $\Pi^m$ is the monopoly profit that includes fixed cost $C_f$. If the incumbent operator can survive, there is $\Pi^m > C_f$.

The mobile telecom operators would choose limit-pricing as a barrier to impede entry of fixed-line carrier if they could set price independently, choose quantity-price $[P^e, Q^e]$ combination as depicted in Figure 3, because incumbent operator would lose if price were lower than $P^e$, and would face threat of entry if price higher than $P^e$. But in actual mobile telecommunication market of China, price had been regulated strictly and set in the higher level than $P^e$, so that the mobile telecommunication market in which there was monopoly profit was an unsustainable contestability market.

![Figure 3](image-url)
Hit-and-run model had depicted a view of entry — the potential entrants could set a price that was lower than $P^e$, enter the market in the time $\tau$, and get monopoly profit, if the price of incumbent firm were higher than $P^e$ and rigidities in the time $\tau$. Though the model had been attacked frequently because price could be changed more easily than decision-making of quantity and entry, it had been actualization in mobile telecom market of China because of price rigidities. PHS had become a short-term investment and an instrument of Hit-and-run.

In the case of China, the MII and the provincial PTTs recommend price structures and levels, and the central and provincial Price Bureaus agree them. Price level of regulation had adjusted very slowly, because without a strong external challenge, such as competition from a new entrant, or a strong political directive from the State Council level, the nature of bureaucracy is to prolong decision-making in the name of consensus or simply to put things of indefinite hold.

Especially, because the market-oriented reform of mobile telecommunication industry had began for several years, the mobile telecommunication carriers deal with price competition based on adaptive expectations rather than rational expectations. In fact, the level of mobile telecommunication charge had gone down gradually only after PHS had entered completely in 2001 (Table 3).

Table 3

<table>
<thead>
<tr>
<th>Year</th>
<th>revenue</th>
<th>Communication time</th>
<th>Charge level</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1394.7</td>
<td>18452809.0</td>
<td>0.76</td>
</tr>
<tr>
<td>2001</td>
<td>1677</td>
<td>29044746.9</td>
<td>0.58</td>
</tr>
<tr>
<td>2002</td>
<td>1951</td>
<td>41839793.5</td>
<td>0.47</td>
</tr>
<tr>
<td>2003</td>
<td>2180</td>
<td>63089057.5</td>
<td>0.35</td>
</tr>
</tbody>
</table>


NRA implemented asymmetric price regulation actually, because they did not certificate PHS as a mobile communications network. In December 1999, the MII issued No.176 bill (“The notice of constituting charge standard of regional wireless connection network”), dictated that the charge of PHS shall adopt the charge standard of fixed-line telecommunication which was much lower than standard charge of mobile telecommunication. In 2002, MII issued bill and declared that PHS was extension and complement of fixed-line telecom. Because of the asymmetric price regulation, the operators of PHS believed that it was impossible that mobile telecommunication carriers implemented predatory pricing for PHS.

4. INFORMAL ENTRY INDUCED EFFICIENCY LOSS

It would be better to introduce competition into basic telecommunication market than further strengthen the administration because the “mechanism design” of regulated economy is not as good as competition price on dealing with dispersing information. The evolution of regulation had indicated that price mechanism would not function if blocked market was not
broken. Because of price regulation partly, the competition in mobile telecommunication market of China was distorted and got three failures — adverse selection of technology, adverse selection of rate balancing, and adverse selection of competition.

4.1. Adverse selection of technology

Though the NRA limited entry to mobile telecommunication market strictly, they left a huge profit space in the market because of price regulation. For evading entry limit in 1999, CHINA TELECOM chose PHS which has an ambiguous status for regulator and a kind of laggard technology.

First, because the signal of PHS was weak, it is necessary to build a base station every 200-500 miters, especially in downtowns. Secondly, there was no international standard of PHS up to now. Thirdly, the frequency for PHS is 1900MHz-1920MHz which was the programming frequency for 3G, would be transferred to TDS-CDMA (Table 4).

<table>
<thead>
<tr>
<th>Carriers</th>
<th>Allocation of frequency</th>
</tr>
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<tbody>
<tr>
<td>China Mobile (68MHz)</td>
<td>GSM900: 885-909MHz; 930-954MHz</td>
</tr>
<tr>
<td></td>
<td>GSM1800: 1710-1725MHz; 1805-1820MHz</td>
</tr>
<tr>
<td>China Unicom (52MHz)</td>
<td>GSM900: 909-915MHz; 954-960MHz</td>
</tr>
<tr>
<td></td>
<td>GSM1800: 1745-1755MHz; 1840-1850MHz</td>
</tr>
<tr>
<td></td>
<td>CDMA IS95: 825-840MHz; 870-885MHz</td>
</tr>
<tr>
<td>China Telecom (20MHz)</td>
<td>PHS: 1900-1920MHz</td>
</tr>
<tr>
<td>China Netcom (20MHz)</td>
<td>PHS: 1900-1920MHz</td>
</tr>
</tbody>
</table>

4.2. Adverse selection of rate rebalancing

Rebalancing refers to moving the prices for different telecommunications services more closely in line with the costs of providing each service, should be treated seriously in price regulation. Theoretically, rate rebalancing will increase social welfare by moving pricing closer to costs. Therefore, there is a strong case to be made for rate rebalancing, with or without the introduction of competition (Intven 2000).

Usually, where telecommunication markets are open to competition, prices of different services will tend to move towards their costs. However, in monopoly or non-competition environment they may not (Ramsey 1927). In China, the entry of PHS brought adverse selection of rate rebalancing. PHS had obvious price advantage because the policy of transaction & clearing among networks encouraged cross-subsidy. According to the policy, as a calling party, mobile telecommunication carrier must pay ¥0.06 per minute to fixed-line carrier, however fixed-line telecom will pay nothing as a calling party. PHS had less sunk costs so that there were fewer barriers to entering to mobile telecom market — PHS had been built based on fixed-line system besides base station

4.3. Adverse selection of competition

Bertrand (1883) insisted that there would be sufficient competition in spite of that there were only two enterprises in an oligopoly market, if the enterprises had provided less differentiation product, had not limit of production capability, and had not tacit collusion. The
market competition between China Mobile and China Unicom were similar to Bertrand competition, but did not get Bertrand Equilibrium. Rather than price mechanism, PHS as a new entrant took the role to promote competition of mobile communications market, but brought adverse selection of competition — predatory pricing.

The distort of competition had brought competition in mobile telecommunication market into the market between mobile telecom carriers and fixed-line carriers, aggravated competition stress of substituting mobile telecom for fixed-line telecom (Figure 3). After PHS had entered, the ARPU of mobile telecommunication decreased gradually, and closed to that of fix-line telecommunication.

Figure 3
The trend of ARPU changing

It meant that there was a predatory pricing strategy. McGee (1980) argues that predation is more costly to the predator than the victim, given the predator's larger market share, and that as the campaign and market share increase, so too do the costs. Against these large and certain costs are future profits which must be discounted in two ways, once to reduce them to present value terms and then again to reflect the uncertainty that they will arise (McGee 1980).

5. CONCLUSION

In this paper, we investigated regulations of NRA and how they can cause mobile telecom market to fail in determining optimal outcomes and competitive price. The regulation failure has once again struggled with a challenge to the free-market ideology of laissez-faire as it debated the proper response to the market failure by the external problem. To increase efficiency of mobile telecom market, NRA should change means of price regulations, improve market structure, and reform property right so that NRA may play as independent regulatory authority rather than a proprietor of telecom carriers.

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